JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

Thursday, November 17, 2005, 1:00 p.m.

JPL - Building 303, Room 401

AGENDA

1. **Introductory Remarks ..... D. Morris**
2. **Conflict Resolution ..... D. Morris**
3. **Action Items..... D. Morris**
4. **SPECIAL REPORT:**
   - **SDU Return Coverage ..... B. Ryan**
   - **MRO Events in 2006 .....R. Sharrow/R. Lock**
   - **DSS-63 Downtime – September 2006 .....A. Andujo**

5. **Resource Analysis Team .....E. Hampton**
   - **Mid-Range Status**
   - **Proposed DSS Downtime Changes**
   - **Special Studies**

Jet Propulsion Laboratory
California Institute of Technology

4800 Oak Grove Drive
Pasadena, CA 91109-8099

(818) 354-4321

November 30, 2005
Refer to: 9110-05-16 AEA: LC

TO: Distribution

FROM: David Morris

SUBJECT: Minutes for the Joint Users Resource Allocation Planning Committee Meeting held November 17, 2005.

NEXT JURAP MEETING:
Thursday, January 19, 2005
JPL Bldg. 303, Room 401 1:00 p.m.

Attendees:

Andujo, A.	Campanelli, L.	Holmes, D	Retana, J.
Baldwin, J.	Espinueva, R.	Kwok, J.	Ryan, B.
Behrozi, A.	Frautnick, J	Lock, R.	Tay, P.
Burke, G.	Hall, J	Morris, D.	Waldher, S..
Call, J.	Hampton, E.	Page, C.	Zamora, K.

The Joint Users Resource Allocation Planning Committee meets monthly to review the status of Flight Projects, the requirements of other resource users, and to identify future requirements and outstanding conflicts. The previous JURAP meeting was held September 15, 2005 at the Jet Propulsion Laboratory.

Introductory Remarks – D. Morris
Welcomed the attendees to the JURAP meeting and announced personnel changes to the RAP team. Changes include the loss of Napoleon Lacey and Sandhya Gudura and the addition of Laura Campanelli. Other acknowledgements and announcements were:

- Hayabusa (Muses-C) asteroid “Itokawa” encounter.
- Venus Express launch on November 12.
- Proposal to track PN10/SC23 (2-way data attempt) is in progress.
- A two week delay in the DSS-15 return to service, new date is December 5, at 0000Z.
- GOES-N Launch is NET January/February 2006.
- STEREO Ahead and Behind launch is NET May 26, 2006.

- There is a minimum of a six-month delay of DAWN launch.
- JUNO Launch moved to 2010.
- The upcoming Phoenix CDR

RARB Action Items – D. Morris

Reported on the status changes of the November 2005 RARB Action Item:

Action Item #1: Pending

Devise solution to problems identified and associated with the new downtimes proposed at the August 2005 RARB.

The focus of today's meeting is to present the proposed recommendations to extend the downtime for DSS-63 in weeks 36 through 39 of 2006 and the impact to the affected projects and missions.

SPECIAL REPORTS

Stardust (SDU) Return Coverage – R. Ryan

The Stardust (SDU) major critical event, Sample Earth Return, has added new requirements due to the new NASA requirements for Earth Return. Problems experienced with the Genesis Sample Return have resulted in NASA implementing strict guidelines with respect to DSN coverage. Critical events cannot be controlled in Real-time but must be on auto sequence. Previous discussion on possible conflicts with New Horizons Launch on January 14 was noted.

Mars Reconnaissance Orbiter (MRO) Events in 2006 – R. Lock

The presentation showed year 2006 is a year of change as well as the busiest year for MRO. He reviewed the mission timeline from MRO launch on August 12, 2005 to arrival at Mars on March 10, 2006. In addition, details on aerobraking, instrument calibration and superior conjunction, and the DSN support for each were presented. Additionally, MRO agreed to the reduction of the 20-degree mask limitations during the Aerobraking phase to 10-degrees, in an effort to increase supportability for themselves and other missions during that time frame.

The review also included; Tiger Team concerns with MRO high-rate data flooding the DSN, HQ concerns whether upgrades will be on time to support the high-rate data flow, and check out of X-band, S-band, and Ka-band the week after Christmas. Additionally discussed were possible up coming leap second issue.

Venus Express Update Status – D. Holmes,

Launch was successful. The planned date for Venus Orbit Insertion (VOI) has shifted and is now over Madrid. The mission requirements for DSN support, after VOI on April 2006 as being approved by HQ. Also discussed were the VEX soler corona R/S requierments as that may impact the September – October 2006 period.

RAPS DSN Downtime Extension Recommendations – A. Andujo

The RAP presentation showed the effect of adding a downtime extension for Antenna Controller Replacement (ACR) at DSS-63 to weeks 36 – 39 of 2006 and the impact to missions during this period. The proposed extension includes weeks 36 – 39 of 2006. The DSMS Engineering team had determined that the time originally allotted for the DSS-63 ACR was insufficient to complete the task

Discussion revolved around the change recommendations to the missions originally supported at DSS-63 during weeks 36 - 39. Positive support and agreement were received from all missions to the proposed redistribution of supports. One of the specific recommendations was to provide to M01O, MEX, and MGS the remaining available Mars tracking windows. Due to the need to accommodate multiple Mars Missions with limited Mars view periods during the DSS-63 extended downtime, the projects have been provided with a comprehensive summary of all available hours and passes at all remaining Subnets. The summary does not include Setup or Teardown times and assumes that these supports will MSPA.

- Project representatives have agreed that it will be the responsibility of M01O, MEX, and MGS to negotiate with each other the distribution and allocation of individual support priority requirements and provide this to the Mid-Range negotiation. They also agreed that missions would MSPA wherever possible. Presently, MRO does not have any MSPA plans in this period. MRO is fully supported. Therefore, MSPA with MRO should be explored to mitigate reduced support to M01O, MEX, and MGS.

For a complete listing of Antenna Downtimes, visit the following link for the RAPS website: http://rapweb.jpl.nasa.gov/planning.html

Resource Analysis Team

Mid-Range Status – *J. Retana*

The RAP Team is now current with negotiations. No additional recovery meetings will be required for the remainder of 2005. The RAP Team sends a special thank you to all Projects and Project Representatives for their support and hard work.

The RAPT Team has negotiated Mid-range schedules out to 24 weeks ahead of real-time. There are currently 13 weeks of conflict-free schedules. Conflict resolution is required for the following eleven (11) weeks: 05/2006 through 12/2006, 14/2006, 16/2006 and 18/2006.

- 2006 Weeks 01 – 04 (THRU 01/29/2006) were released to DSN Scheduling on November 15, 2005
- 2006 Weeks 05 – 08 (THRU 02/26/2006) are due to be released to DSN Scheduling on December 5, 2005
- 2006 Weeks 09 – 18 (THRU 05/07/2006) are awaiting conflict resolution for remaining conflicts.

Special Studies Summary:

- Preliminary Assessment of SOHO HSO Schedule Completed: September 19, 2005 (March – May 2006)

  Purpose

  The SOHO project tasked RAPS with an evaluation study of the impact to SOHO Helioseismology Observations (HSO) for the period of March –May 2006 with regard to the closure of DSS-16.

  Conclusion

  SOHO can expect to receive acceptable coverage at Goldstone for the period of

March – May 2006. Any contention will be handled during the Mid-Range negotiation process.

On-going Special Studies/Activities

- Downtime Planning
- MADB/TIGRAS Testing, Training, and Database update
- New STERIO A& B May 26, 2006 Launch Study
- RARB Prep for February

CRITICAL EVENT COVERAGE

ISSUES REGARDING THE DSN COVERAGE FOR STARDUST EARTH RETURN

- THIS IS A MAJOR, LEVEL 1, CRITICAL EVENT, DRIVEN BY NASA HUMAN SAFETY CONSIDERATIONS, AND ALSO ABOUT MISSION SUCCESS.

- IT IS VITAL TO MAINTAIN COMMUNICATION WITH THE SPACECRAFT DURING THE MANEUVER ACTIVITY TO ENSURE CONTROL LEADING UP TO THE CAPSULE RELEASE, THE ABILITY TO ACHIEVE A PRECISE TARGET POINT TO SAFELY LAND IN UTAH AT UTTR.

- FOR NASA HUMAN SAFETY CONSIDERATIONS, THIS SAME COMMUNICATION CAPABILITY IS NEEDED TO BE ABLE TO STOP THE RELEASE, AND SAFELY DIVERT THE SPACECRAFT TO PREVENT ANOMALOUS ENTRY, BURN-UP AND BREAKUP, AND POSSIBLE DEBRIS FIELD.

- THE ADDED DIFFICULTY IS THE PLANNED LAUNCH OF THE NEW HORIZONS PLUTO MISSION, SCHEDULED FOR JANUARY 11; WITH THE POSSIBILITY OF A DAILY LAUNCH SLIP THROUGH JANUARY 14. WHILE THERE IS NO DIRECT VIEW PERIOD OVERLAP, STATION FOCUS, PREPARATION, AND CALIBRATION HAVE TO BE COMPROMISED WITH THE STARDUST EVENTS.

FOR THESE REASONS, STARDUST HAS TO MODIFY THE TRACKING STATION REQUESTS DURING THIS RETURN PERIOD, THE FINAL DAYS.

- TELEMETRY AND TRACKING DATA BECOMES VITAL STARTING AT 0000 UTC ON DOY013. THIS PROVIDES THREE COMPLEX INFORMATION OF TRAJECTORY DATA, THROUGH THREE EVENTS, THAT ENDS AT 1000 UTC ON DOY015.

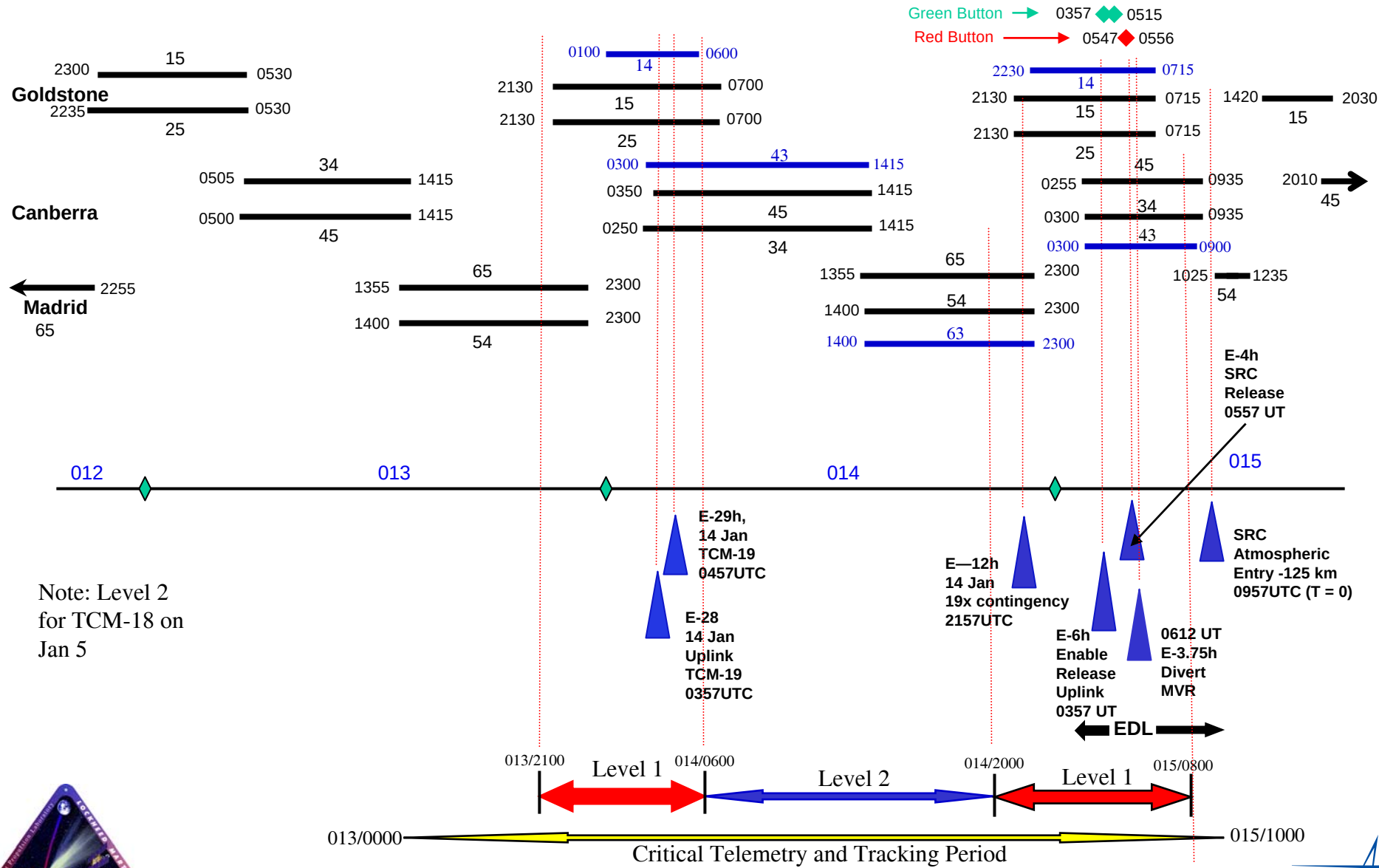
CRITICAL EVENT COVERAGE

- THE CRITICAL SUPPORT, REQUIRING UN-INTERRUPTED COMMAND, TELEMETRY, AND RADIO METRIC DATA, FALLS INTO THE LAST THREE DAYS OF RETURN.
- THERE IS A FINAL TARGETING TCM, PLANNED AT MINUS 29 HOURS, AT 0500 UTC ON DOY 014.
- THERE IS A BACKUP, CONTINGENCY, TCM AT MINUS 12 HOURS, AT 2200 UTC ON DOY 014.
- THE RELEASE SEQUENCE, STOP WINDOW, AND BUS DIVERT MANEUVER RUN FROM 0400 TO 0900 UTC ON DOY015.
- TO ENSURE THIS CONTINUOUS SUPPORT PERIOD FROM THE DSN, STARDUST IS REQUESTING 70 METER SUPPORT BESIDES THE 34 METER HEF AND BACKUP 34 METER BWG.
- THIS WOULD START ON DOY 014 WITH DSS 14 BOT AT 0100, AND GO THROUGH 0900 AT DSS 43 ON DOY 015, FIVE TRACKS.

DOY 014 DSS 14 0100 TO 0600 (TRACK TIME)
DOY 014 DSS 43 0300 TO 1415 (TRACK TIME)
DOY 014 DSS 63 1400 TO 2300 (TRACK TIME)
DOY 014 DSS 14 2230 TO 0715 (TRACK TIME)
DOY 015 DSS 43 0300 TO 0900 (TRACK TIME)

- IN EXCHANGE, STARDUST CAN COMPROMISE THE 34 METER BWG START TIMES TO ALLOW NECESSARY TURN-AROUND AND PRE-CALS FOR NEW HORIZONS.

CRITICAL EVENT COVERAGE



Note: Level 2 for TCM-18 on Jan 5

The Mars Reconnaissance Orbiter Mission

2006 - A Year of Changes

LOCKHEED MARTIN

THE JOHNS HOPKINS UNIVERSITY

THE UNIVERSITY OF ARIZONA.

Malin Space Science Systems

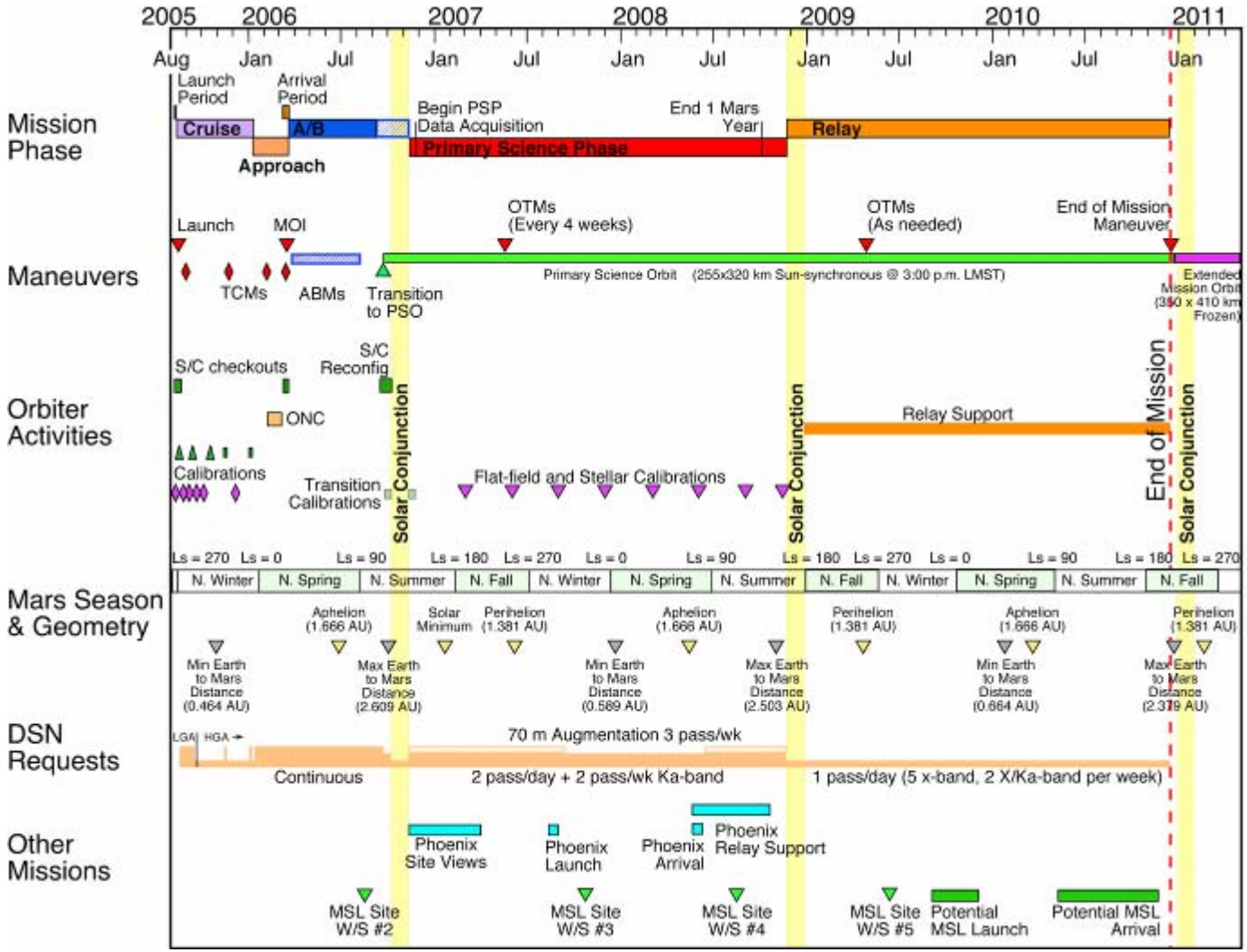
JPL

asi agenzia spaziale italiana

Overview

- Introduction - Mission Timeline
- Current Status
- Cruise, MOI and Aerobraking Phase Overview
- Primary Science Phase
- Backups
  - Mars Exploration Program
  - Science and Mission Objectives
  - Mission Overview
  - Spacecraft Overview
  - Science and Engineering Payloads
  - Cumulative Data Volumes

MRO Mission Timeline



Mission Status To Date

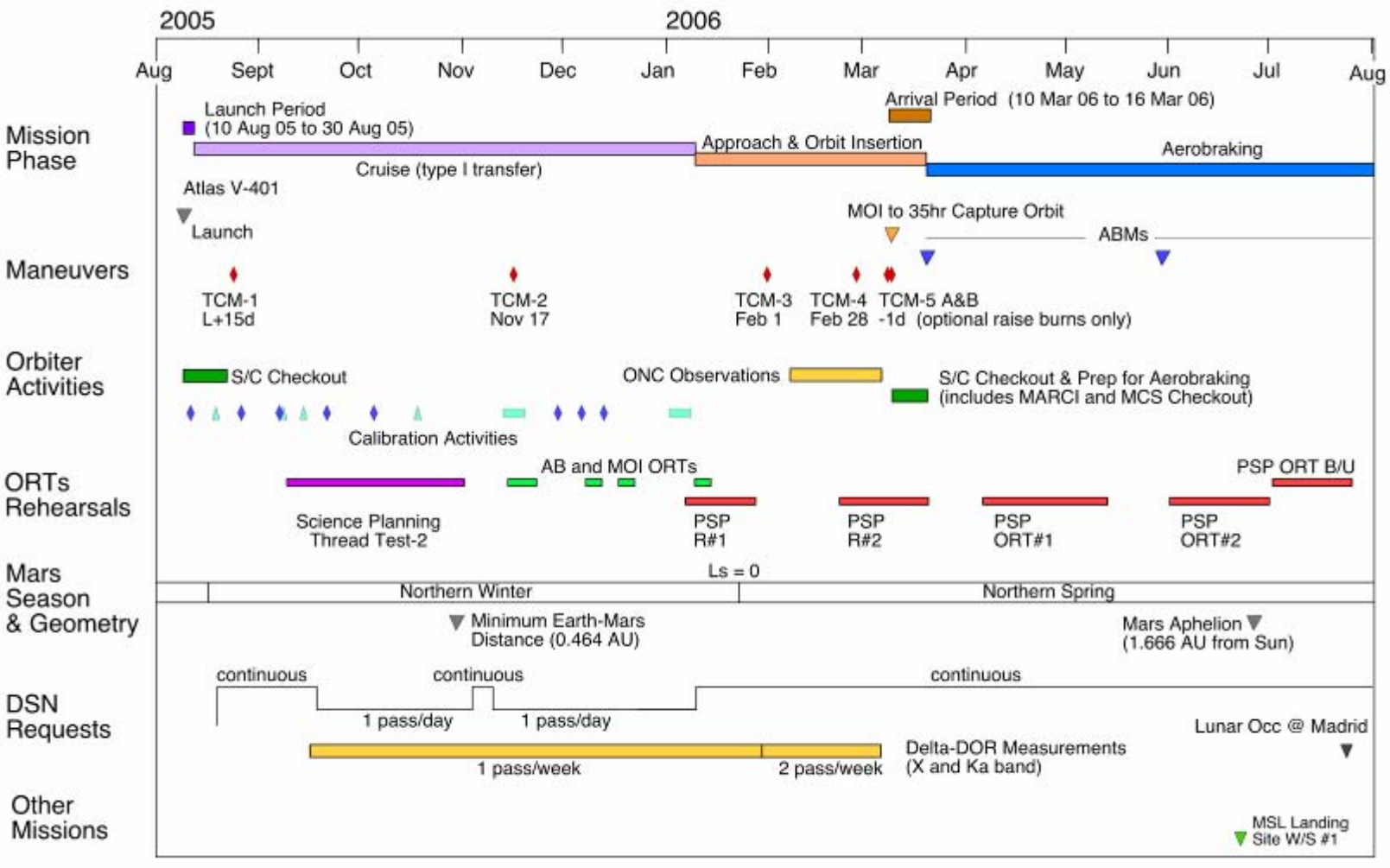
- Launched on the 3rd day of the launch period.
  - Nominal injection (errors <1 sigma).
  - All deployments and station AOS were per plan (including JAXA coverage).

- Ground system performance is nominal.
  - Data flowed over the entire path at 6 Mbps successfully.
  - Ops team functioning superbly - all objectives planned during this very busy phase have been met.

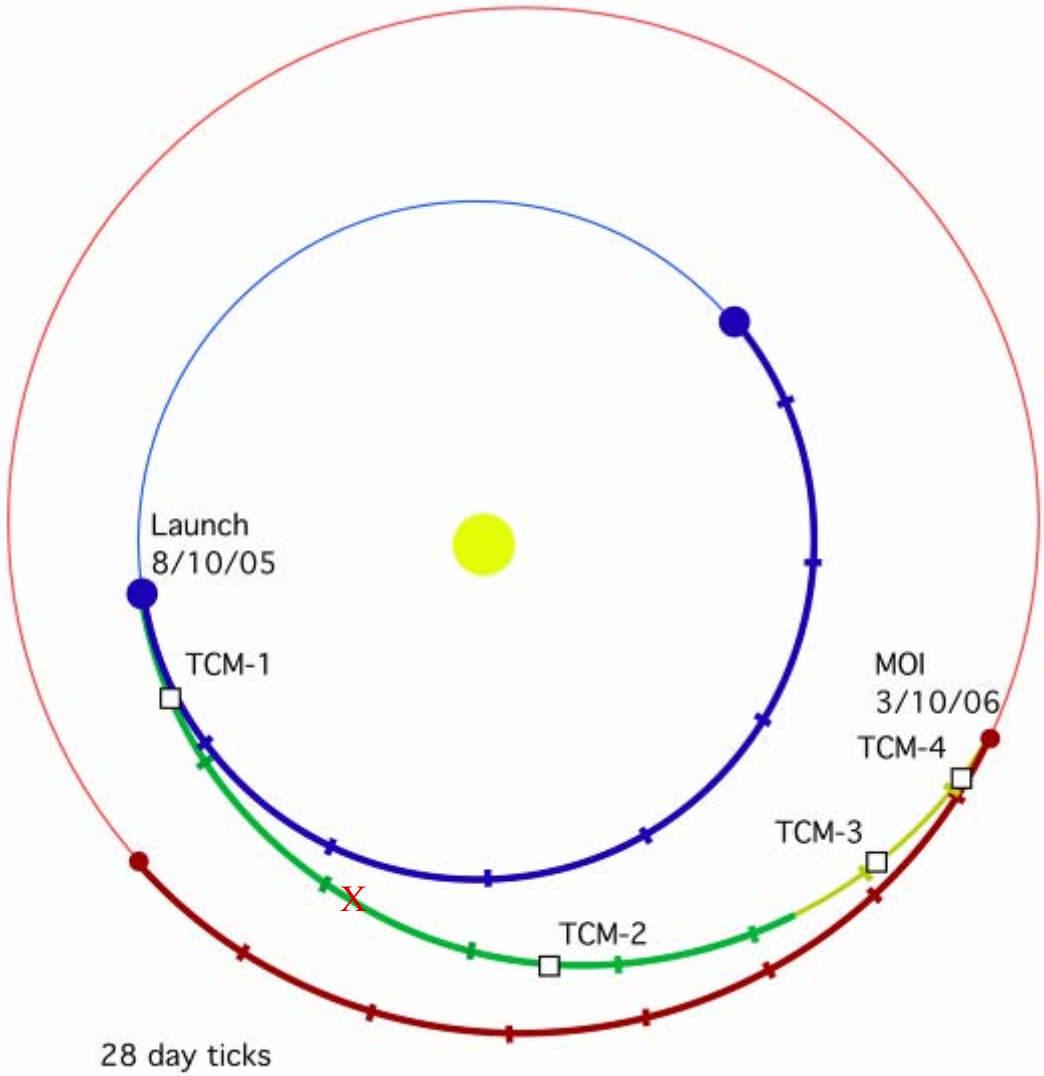
Status (Cont.)

- Orbiter is performing nominally.
  - Bus and instrument checkouts complete.
  - Planned calibration items complete.
  - Payload performing well - meeting level 1s.
  - Orbiter to Earth link supported 6 Mb/s over both X and Ka bands

Cruise / Approach / Aerobraking Timeline



Cruise Phase



Cruise and Approach Activities in Early 2006

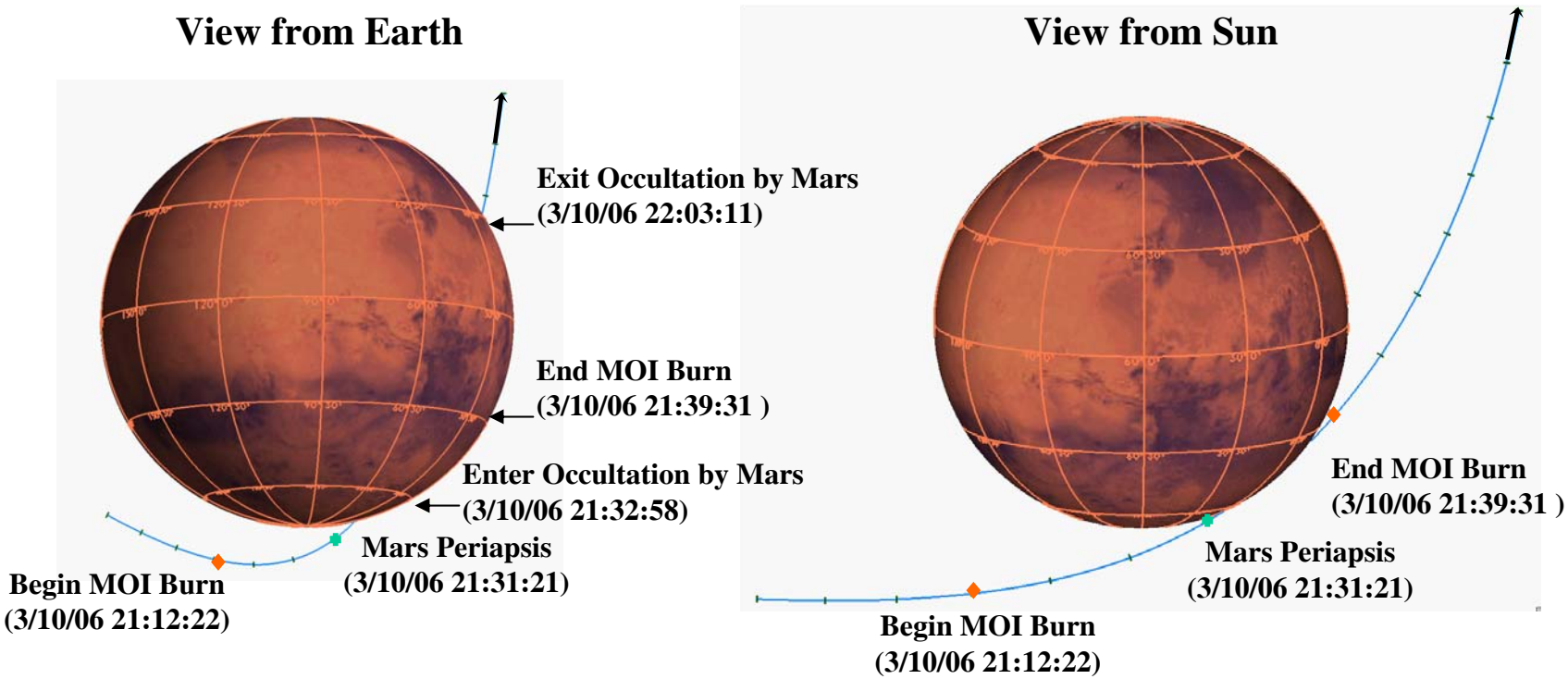
- 12/28/05 to 1/5/06: Solar Radiation Pressure Calibration
  - Continuous Coverage
  - D-DOR on 12/29, 1/1, and 1/3
- 1/8/06: Continuous coverage begins for Approach Phase
- 1/18/06: High Gain Antenna Calibration #2
- Possible CRISM activity being proposed between 1/5 and 1/20
- 1/20/06: Cut off for Cruise Activity
- 3/10/06: MOI and the start of Aerobraking

MOI Phase Overview

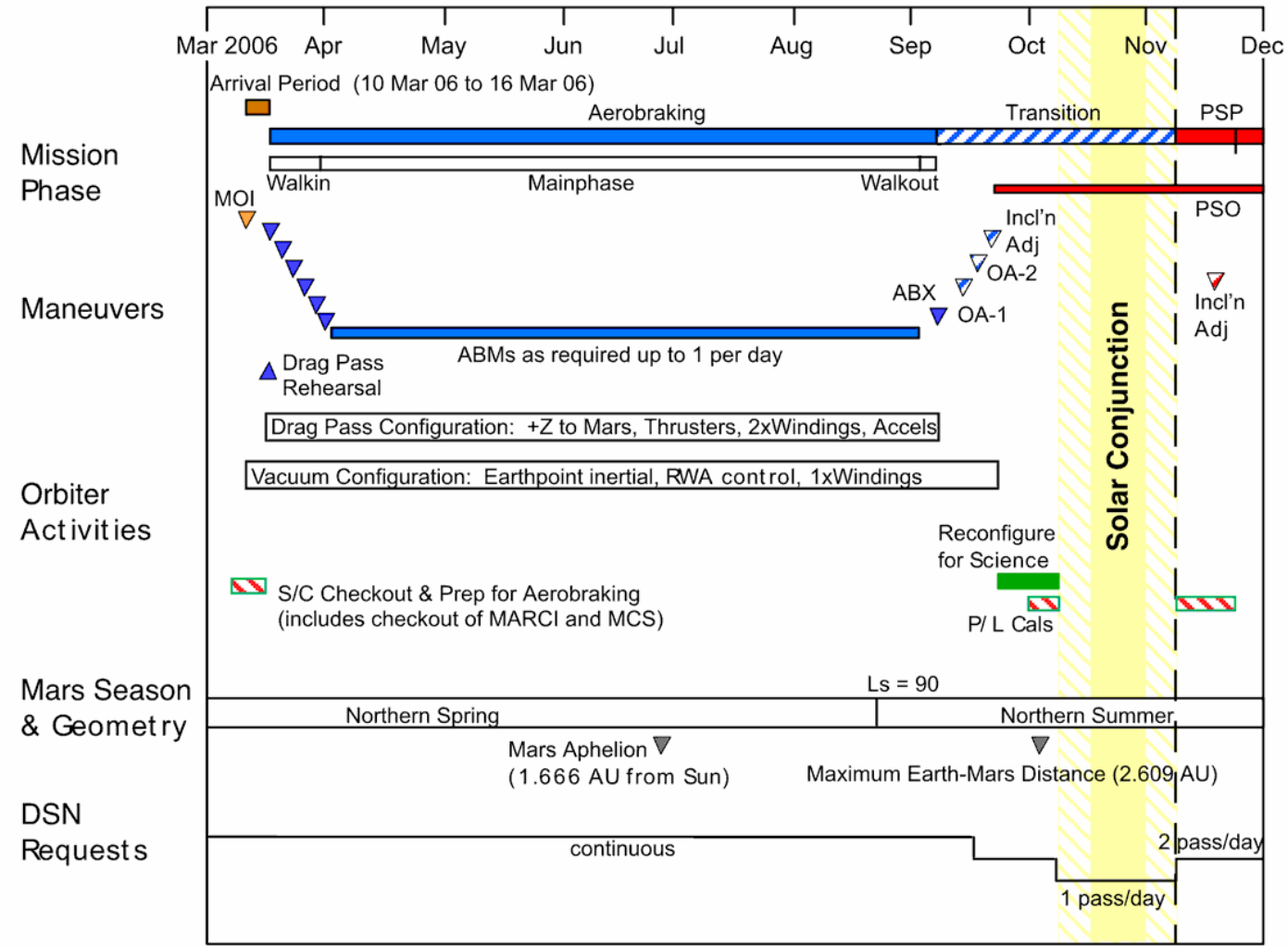
- The MOI phase begins @ MOI –8 days

- MOI phase key activities/events:
  - MOI –8 days - MOI sequence and supporting cfg files are loaded
  - MOI –7 days through MOI –3 days - ONC Phase II
  - MOI –2 days – Stop ONC Phase II and turn off ONC
  - MOI –24 hrs - TCM5a opportunity
  - MOI –6 hrs - TCM5b opportunity
  - MOI –1 hr - Transition to MOI FP settings and "go fast"
    - Recovery using MOI Recovery Block vs Restarting MOI Nominal Block
- MOI phase ends with orbit capture
  - Post-MOI telemetry assessments
  - Mission phase set to aerobraking

Mars Orbit Insertion Timing



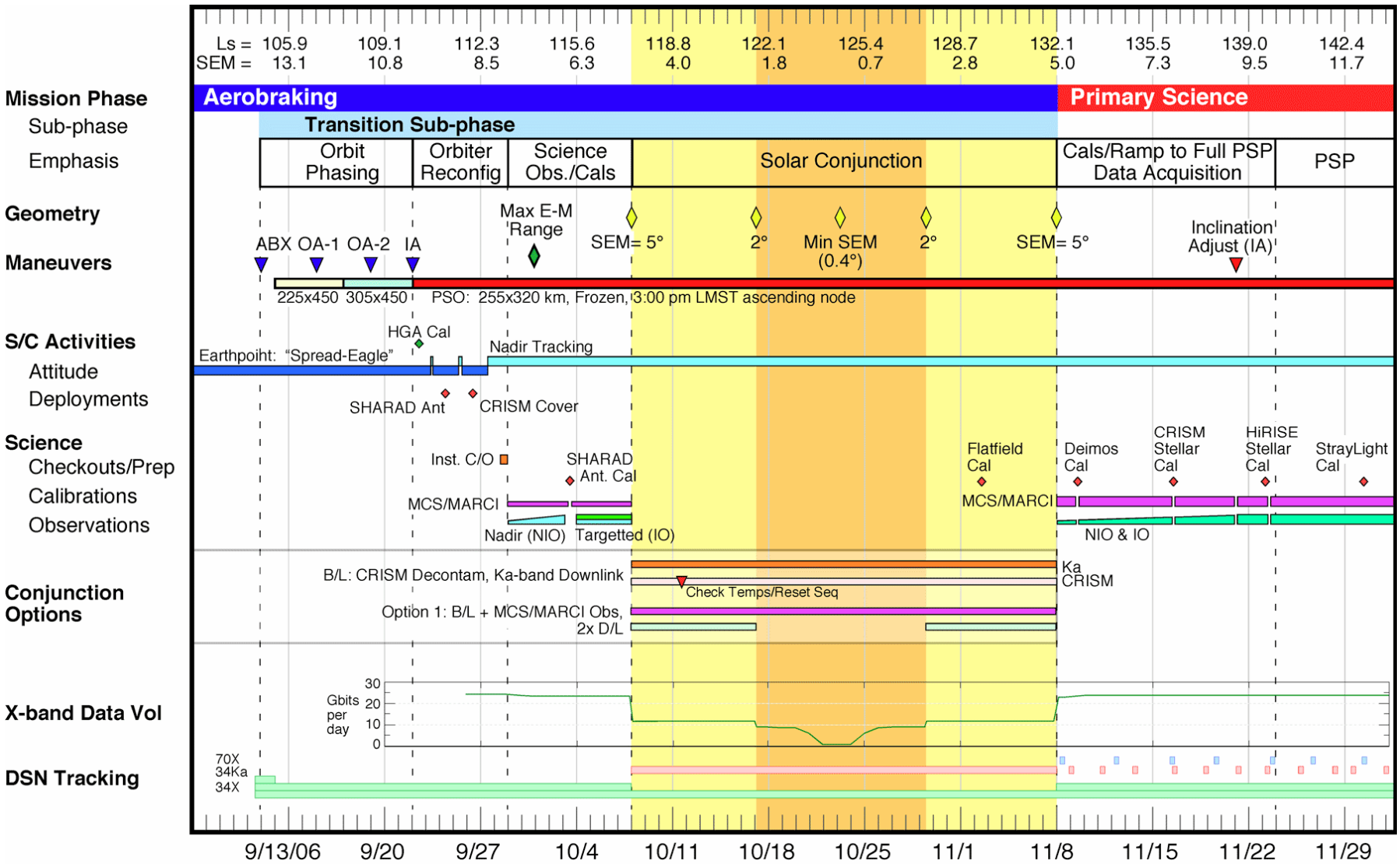
Aerobraking Timeline



Aerobraking Phase

- Mission Design:
  - Aerobraking starts 1 week after MOI to allow for spacecraft checkout
  - Begins with "Walkin" – a series of ABM's on alternating orbits designed to gradually lower periapse into the nominal drag corridor
    - 10-14 orbits (5-7 ABM's)
    - 2 orbits per ABM allows for multiple samples of a given periapse altitude to account for atmospheric variability
  - "Mainphase" is where the bulk of the orbit period reduction is obtained
    - ~ 500 orbits
    - Glideslope based on heating rate or dynamic pressure
  - "Walkout" begins when we become limited by orbit lifetime (the time it takes for the orbit to decay to some minimum level)
    - Required to maintain at least 48 hrs orbit life
    - Periapse altitude gradually raised to maintain orbit life
  - ABX (Aerobraking Exit Burn) is executed once apoapse altitude reaches 450 km and is done to raise periapse safely out of the atmosphere in preparation for transition to PSO

Transition Timeline



Transition Phase Overview

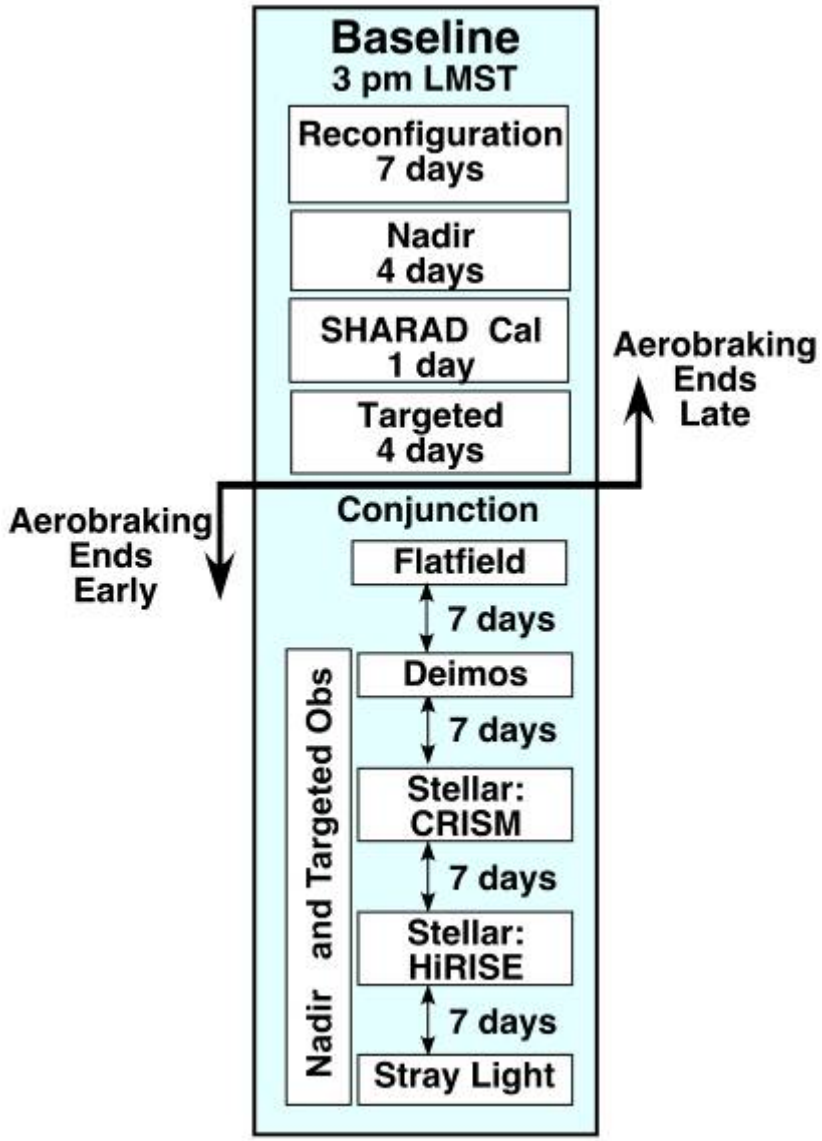
- Goals of the Phase:
  - Safely establish the Primary Science Orbit prior to solar conjunction
  - Prepare spacecraft for solar conjunction
  - Reconfigure spacecraft for science operation. Includes performing science calibrations that:
    - Are necessary to enable the successful analysis of PSP science observations
    - Test spacecraft capabilities needed for the PSP
    - Are best performed in the PSO

Transition Phase Activities

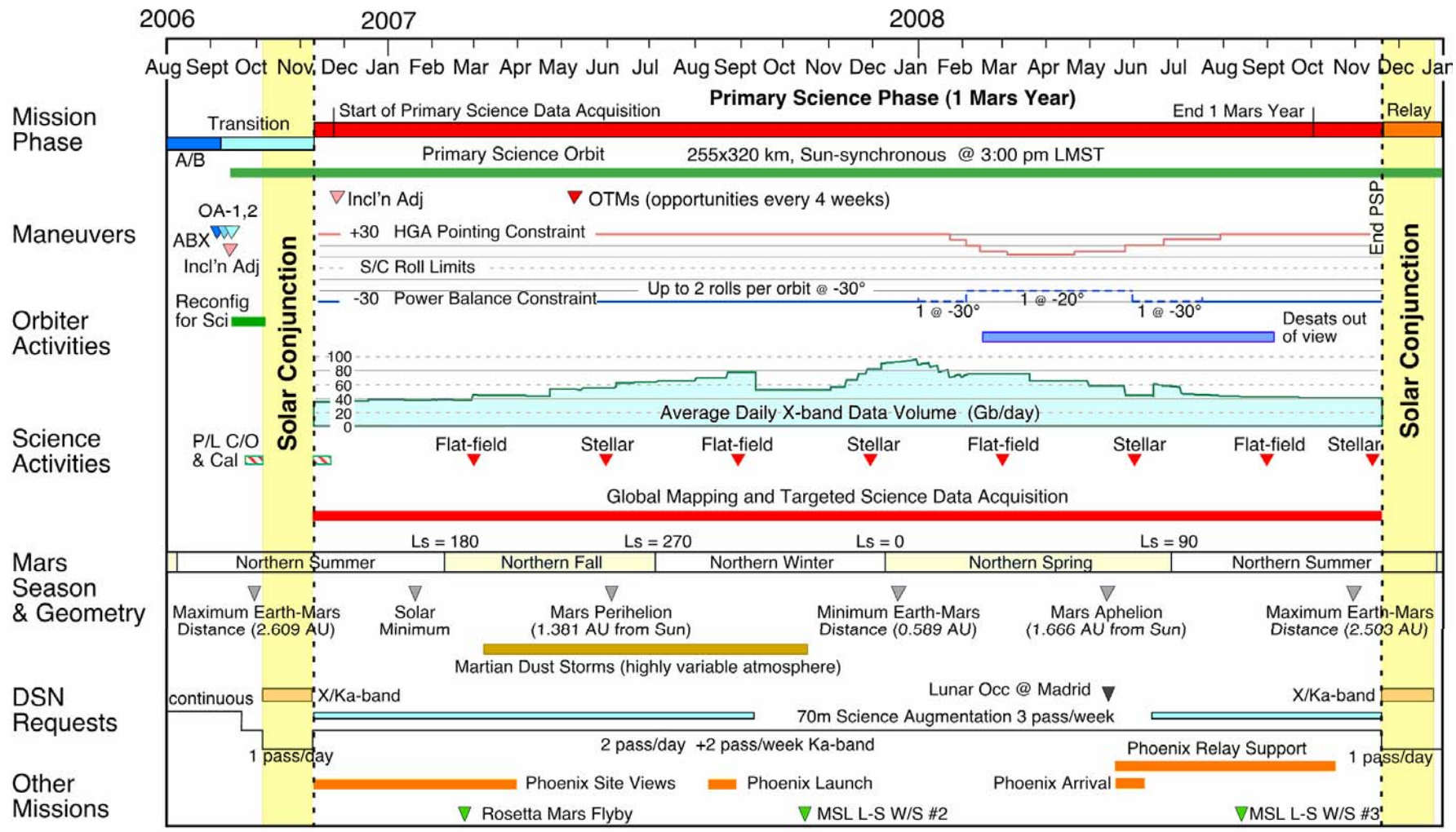
- Establishment of the PSO
  - Orbit Adjustment #1
  - Orbit Adjustment #2
  - Inclination Adjustment
- Instrument Deployments
  - CRISM Cover
  - SHARAD Antenna
- Spacecraft Activities
  - HGA Cal Part 2
  - Brief Nadir Pointing
  - Final Nadir Orientation
- Instrument Calibrations
  - Instrument Checkout
  - SHARAD Commissioning
  - Flat Field Cal
  - Demos Cal
  - CRISM Stellar Cal
  - HiRISE Stellar Cal
  - Stray Light Cal
- Pre-Conjunction Observations
  - 4 days Nadir Observations
  - 4 days Targeted Observations

Timing Flexibility

- Time from Aerobraking End (ABX) to conjunction start is variable
- Activities will shift around conjunction based on prioritized schedule
- One week scheduled between major activities to balance operations workload



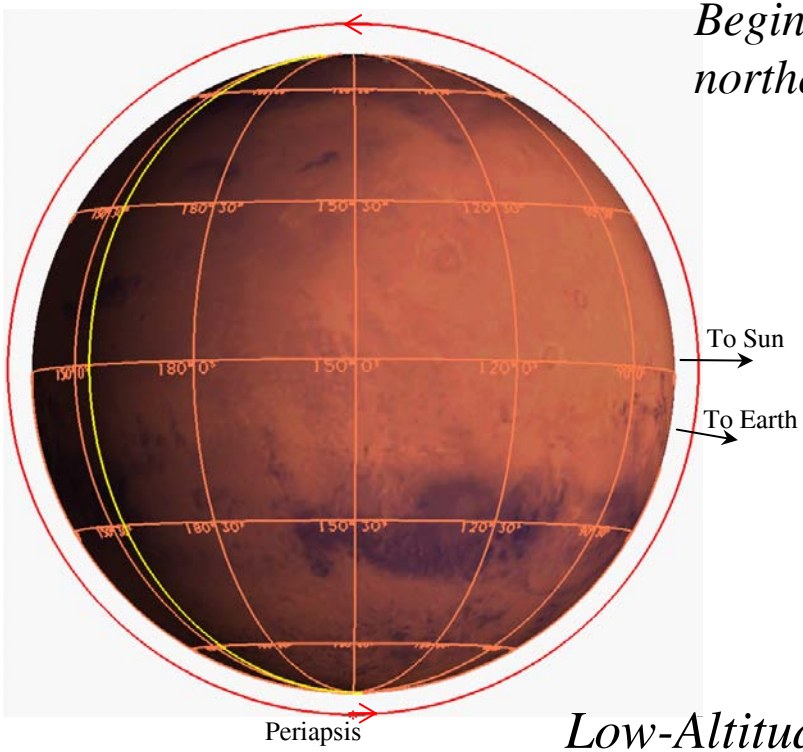
Primary Science Phase Timeline

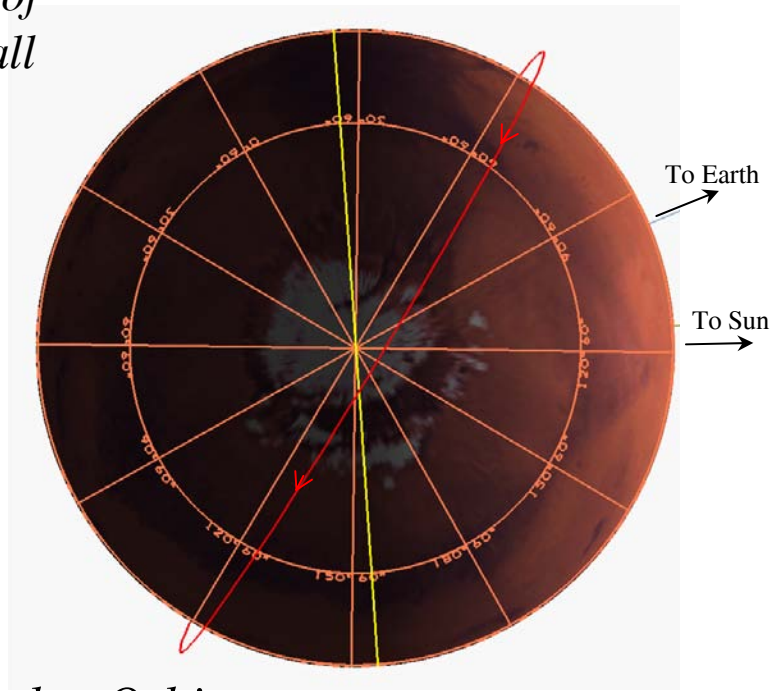


Primary Science Orbit

View from Trajectory North

View from Mars North Pole





Low-Altitude, Polar Orbit

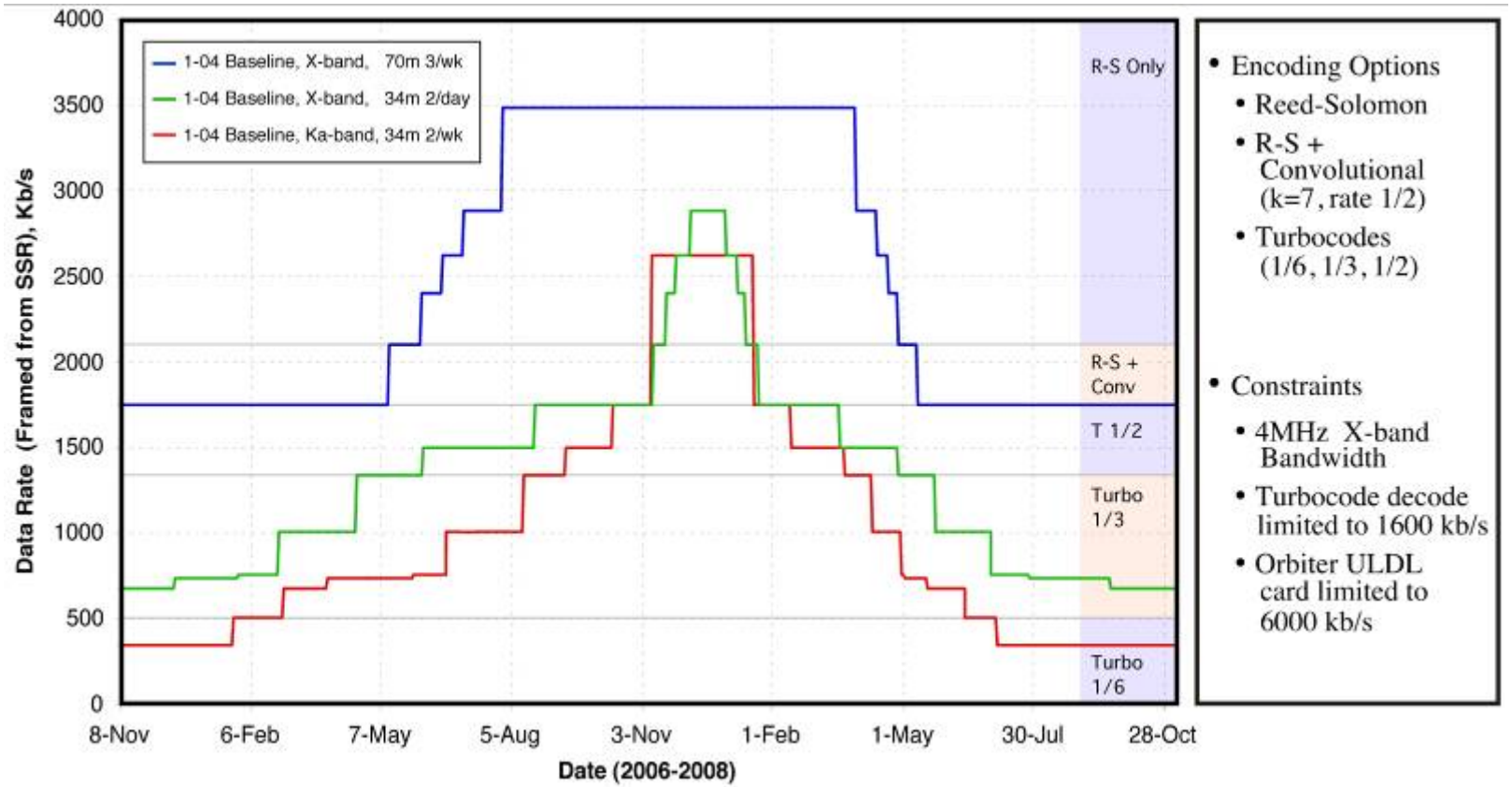
- Sun-synchronous with a 3:00 PM local mean solar time (LMST) ascending node (AN)
- "Frozen" Orbit - Argument of Periapsis remains fixed over Southern Pole
  - Periapsis Altitude = 255 km, Apoapsis Altitude =320 km
- Repeating Groundtrack
  - Global targeting coverage in 17 days, Exact repeat: Sub-5 km spacing after 358 days

Science Data Return / Data Volume

- DSN Tracking Schedule (during Primary Science)
  - Baseline, Two 34m DSN passes per day
  - Science Augmentation, Three 70m DSN passes per week
  - Ka-band Demonstration, Two 34m DSN passes per week

- Mission Data Volume Estimates
  - Expected primary science phase mission data volume: 34 Tb
  - Data volumes are a function of:
    - Daily data rates from range, coding type, discrete rate selection in C&DH
    - DSN tracking schedule (Orbit period and occultation durations determines available downlink duration)
    - Lockup times and HGA rewind constraints - reduces downlink duration

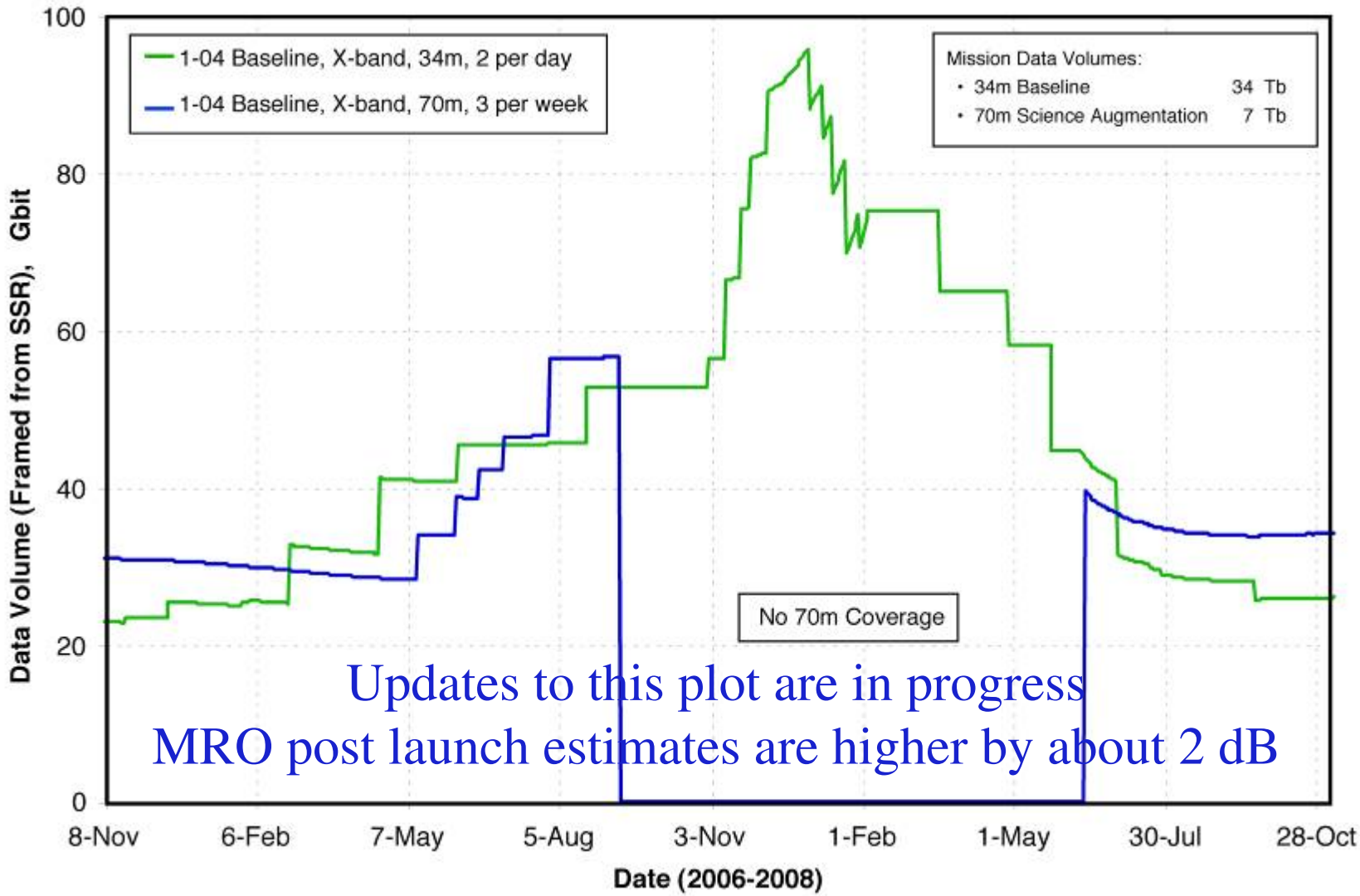
Daily Data Rates during the PSP



Updates to this plot are in progress

MRO post launch estimates are higher by about 2 dB

Daily Data Volumes during the PSP



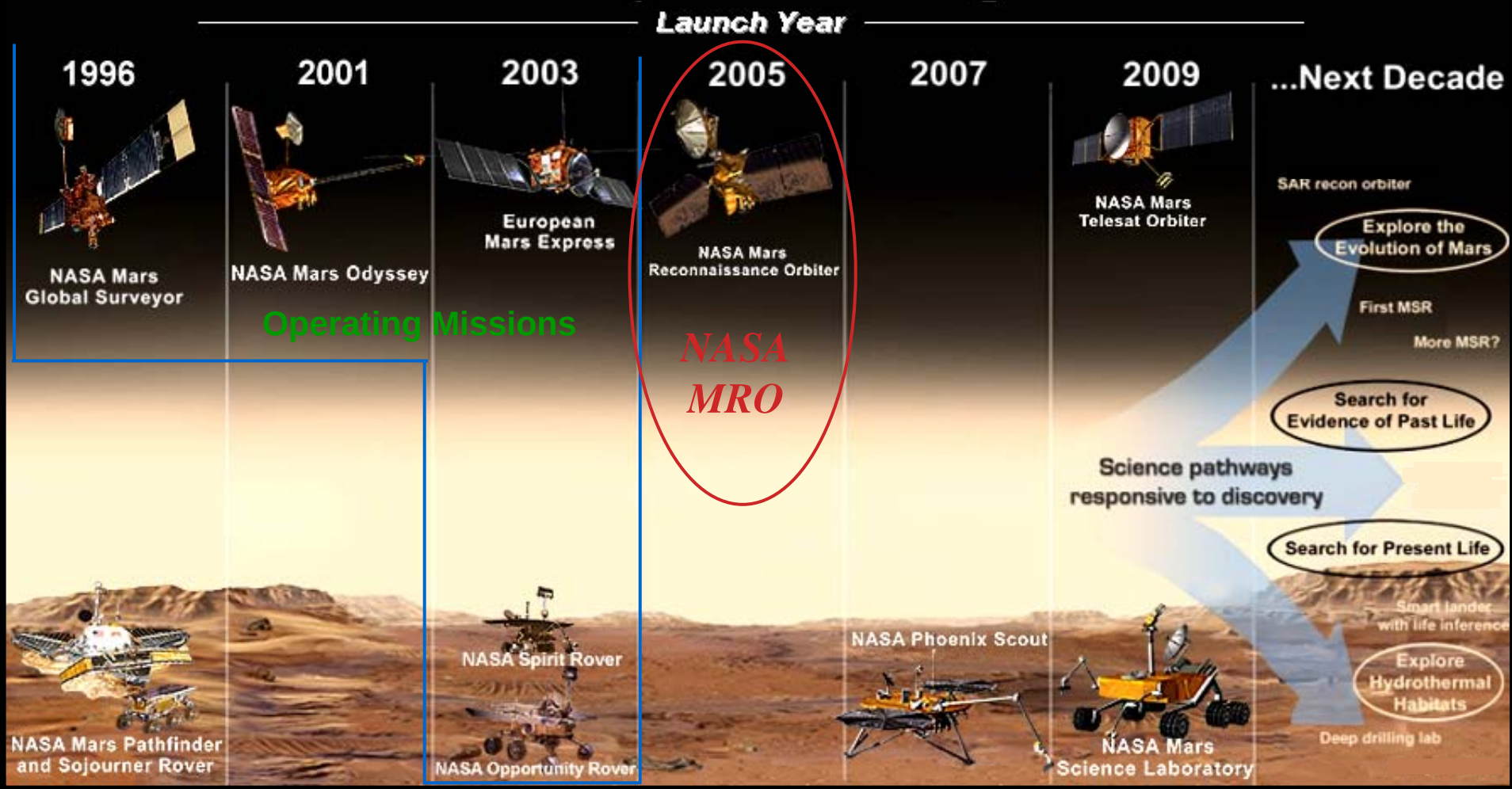
Updates to this plot are in progress

MRO post launch estimates are higher by about 2 dB

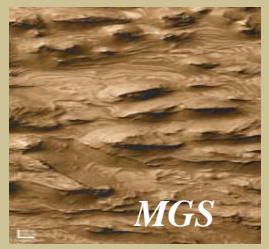
Backups

- Program, Science and Mission Overview
- Orbiter Overview
- Cumulative Mission Data Volume

Robotic Mars Exploration



MRO Science Objectives

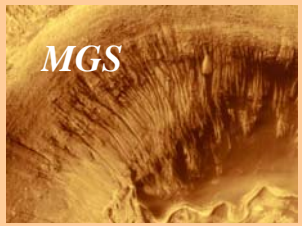


- ✓ **Characterize the present climate of Mars and its seasonal and year-to-year changes**
- ✓ **Determine the nature of complex layered terrain on Mars and identify water–related landforms**
- ✓ **Find aqueous minerals or evidence of hydro-thermal activity; probe the deep subsurface for water ice**
- ✓ **Characterize the Martian gravity field and upper atmosphere in greater detail**
- ✓ **Identify those sites with the highest potential for landed science and sample return by future Mars missions**
- ✓ **Return scientific data from Mars landed craft**

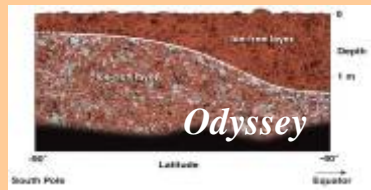
MRO Mission Objectives

- **Conduct the MRO Science Investigations**
  - **Meter-scale and context (6 m/pixel) imaging**
  - **Hyperspectral (25 m, 10 nm) compositional mapping**
  - **Atmospheric profiling and weather monitoring**
  - **Radar probing of the near-subsurface**
  - **Gravity science**

- **Conduct the Optical Navigation and Ka-Band Technology Demonstration Experiments**

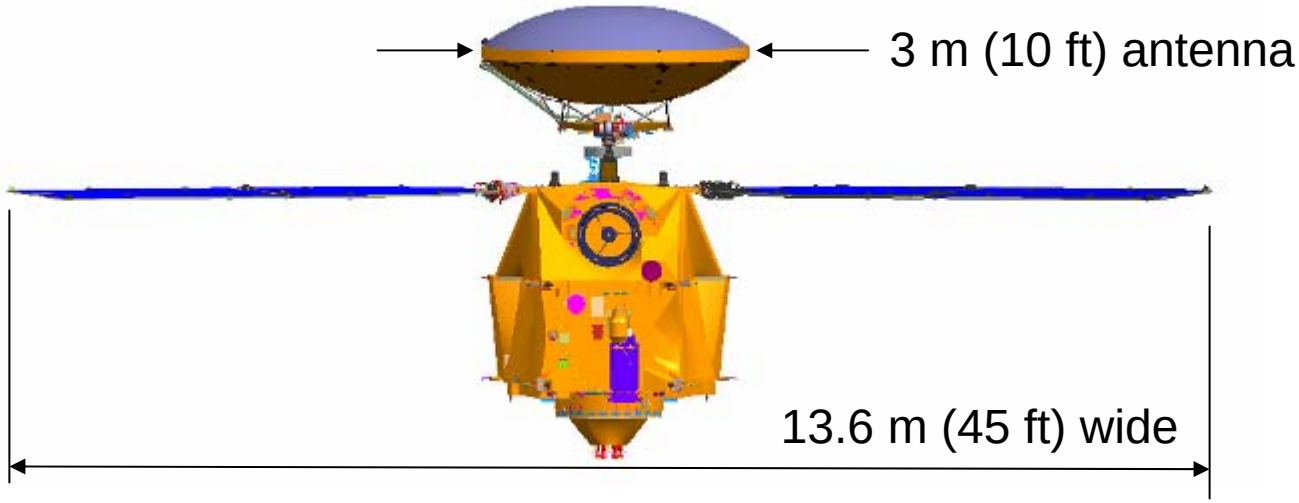


- **Provide telecommunications/relay capability for future missions launched as part of the Mars Exploration Program**



- **4 Earth years in Mars orbit (near polar, 3 p.m. LMST, 255 x 320 km)**
  - **2 years science observations plus relay support**
  - **2 years relay mode with capability to extend science operations**
  - **Launch: Aug 2005; Arrive: Mar 2006; Aerobrake: Mar - Oct 2006; Mission End: Dec 2010**

MRO At A Glance



- Mass: 2,180 kilograms (4,806 pounds) total at launch,
  - 131 kg (289 pounds) Science Payload
  - 850 kg (1,874 pounds) other Dry Weight
  - 1199 kg (2644 pounds) of Propellant
- Power:
  - 20 square meters (220 square feet) of solar panels
    - 2,000 watts of power at the mission's farthest point from the Sun
  - Nickel-hydrogen batteries for when the panels are not illuminated

Spacecraft Overview / Configuration

2180 kg Launch Mass (Atlas V)

1544 m/s Delta-V

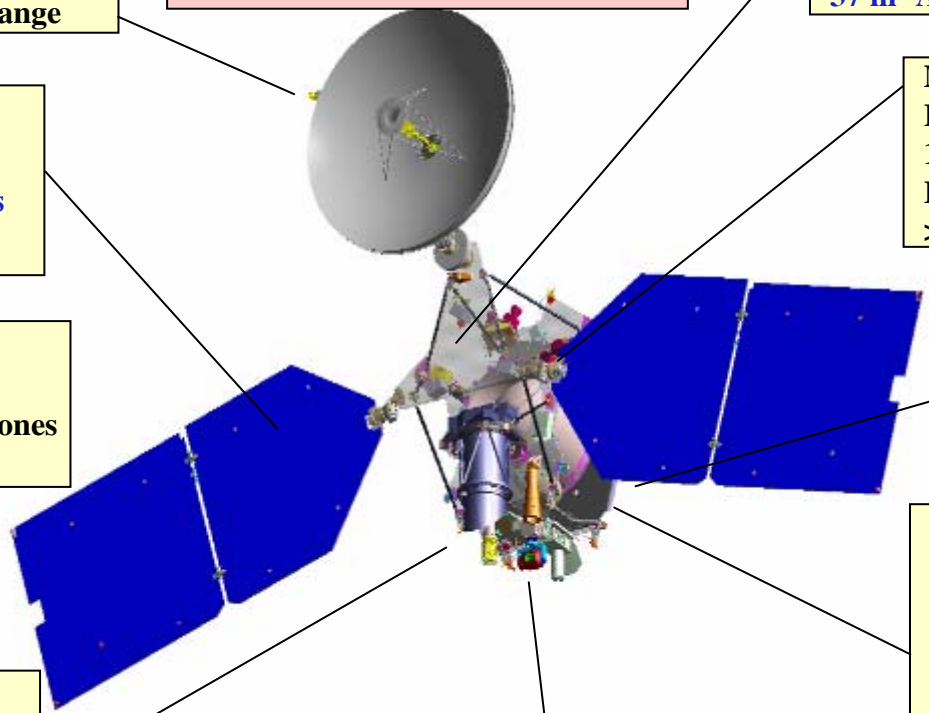
2000W Array at Mars Aphelion

Telecom:
- 3m HGA
- Dual X and Ka-Band Capability
- Dual Fwd-Aft Tx/Rcv LGA
- 550 kbps @max earth Range

Structure:
- M55J Composite Construction
- Stiff Strut / Panel / Clip Design
- Symmetric / Aero-Stable Design
- 37 m^2 AB Drag Area

EPS:
- 20 m^2 GaAs 3J Solar Cells
- Dual 50 A-Hr NH_2 Batteries
- 23% Margin at Aphelion

Mechanisms:
- Redundant DC-Brushless Motors
- 16-Bit Resolvers
- Redundant Release Mechanisms
- > 2X Holding torque During MOI



Thermal:
- Cold-Biased Passive Design
- Largely FSW Controlled Htr Zones
- 240W Allocation

C&DH:
- RAD750 FPC
- 160 Gbit SSR
- Turbo or RS Encoding
- 100Mbps Science I/F

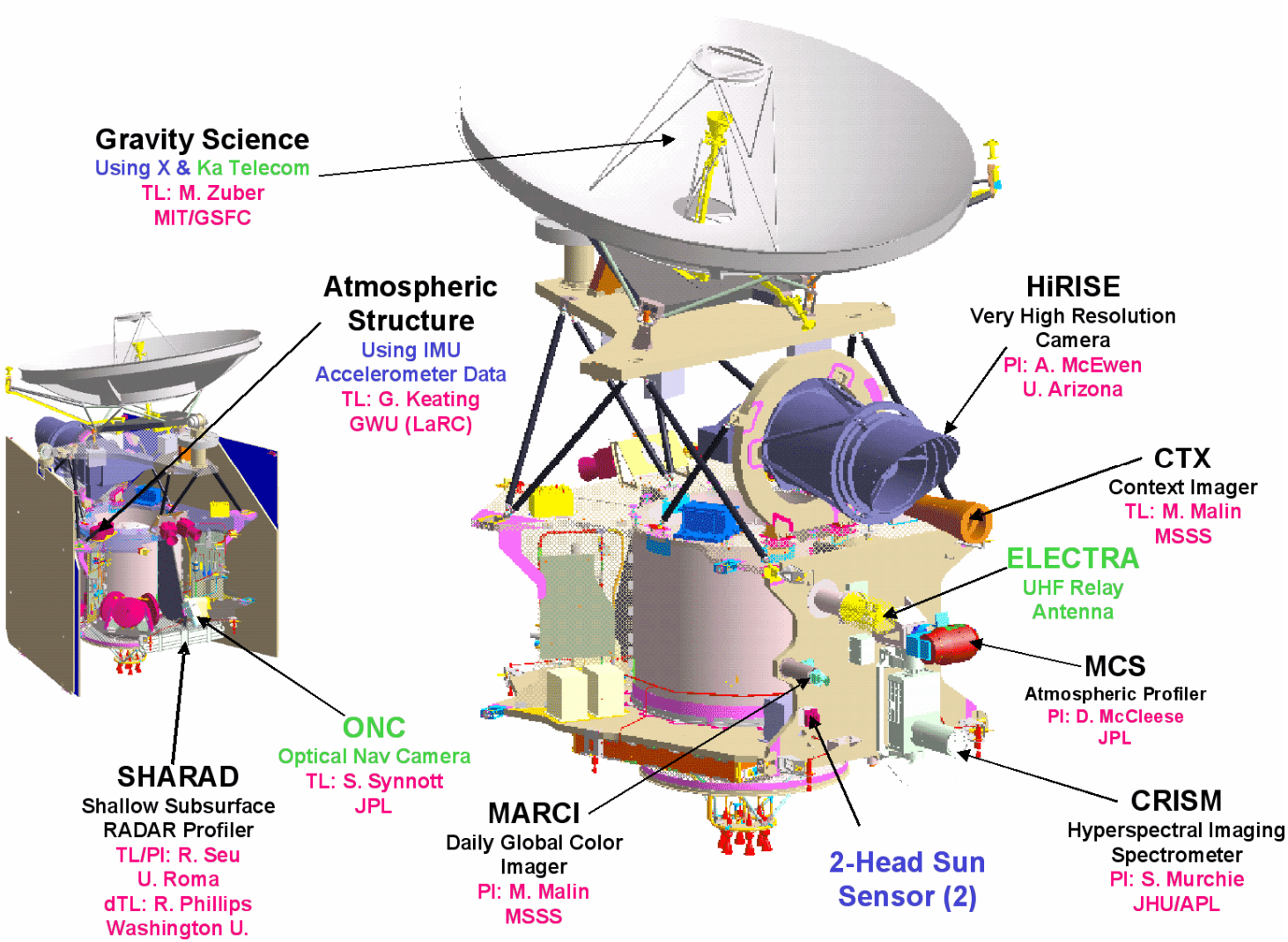
GN&C:
- Redundant 100n-m-s RWA's
- Ephemeris-Based Targeting
- Cont/Auto Yaw Compensation
- < 1 mrad Pointing Accuracy

Propulsion:
- Monopropellant Design
- Large Single-Tank
- Coupled Thrusters
- Regulated During MOI
- Engine-Out Capability

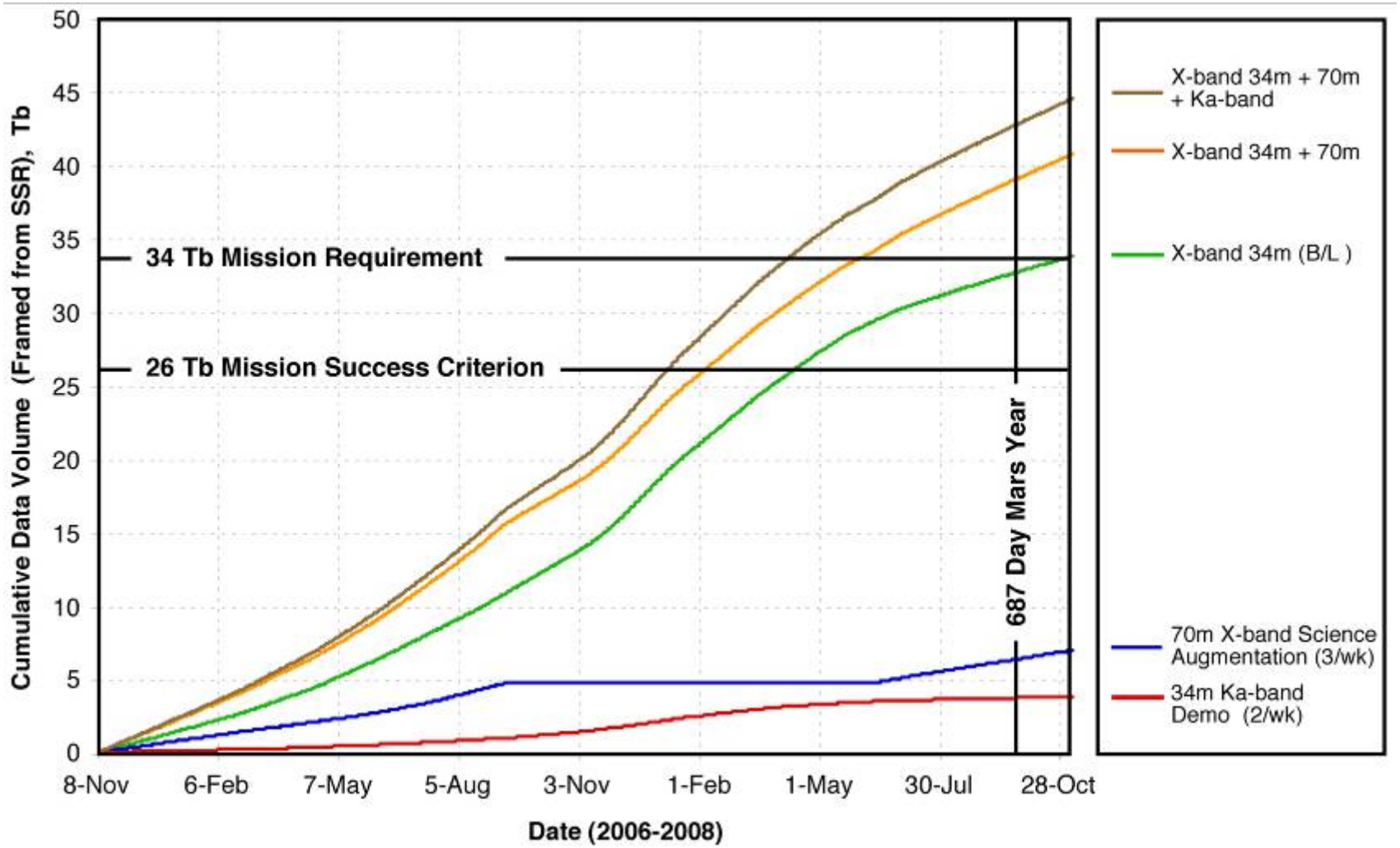
Payload:
- 6 Science Payloads
- 3 Engineering Payloads
- Simultaneous Operations
- Nested Targeting

FSW:
- Flexible / Parameterized Design
- Fully Enabled Fault Protection
- Ephemeris-Based Targeting
- Time-Tagged Seq Fully Supported

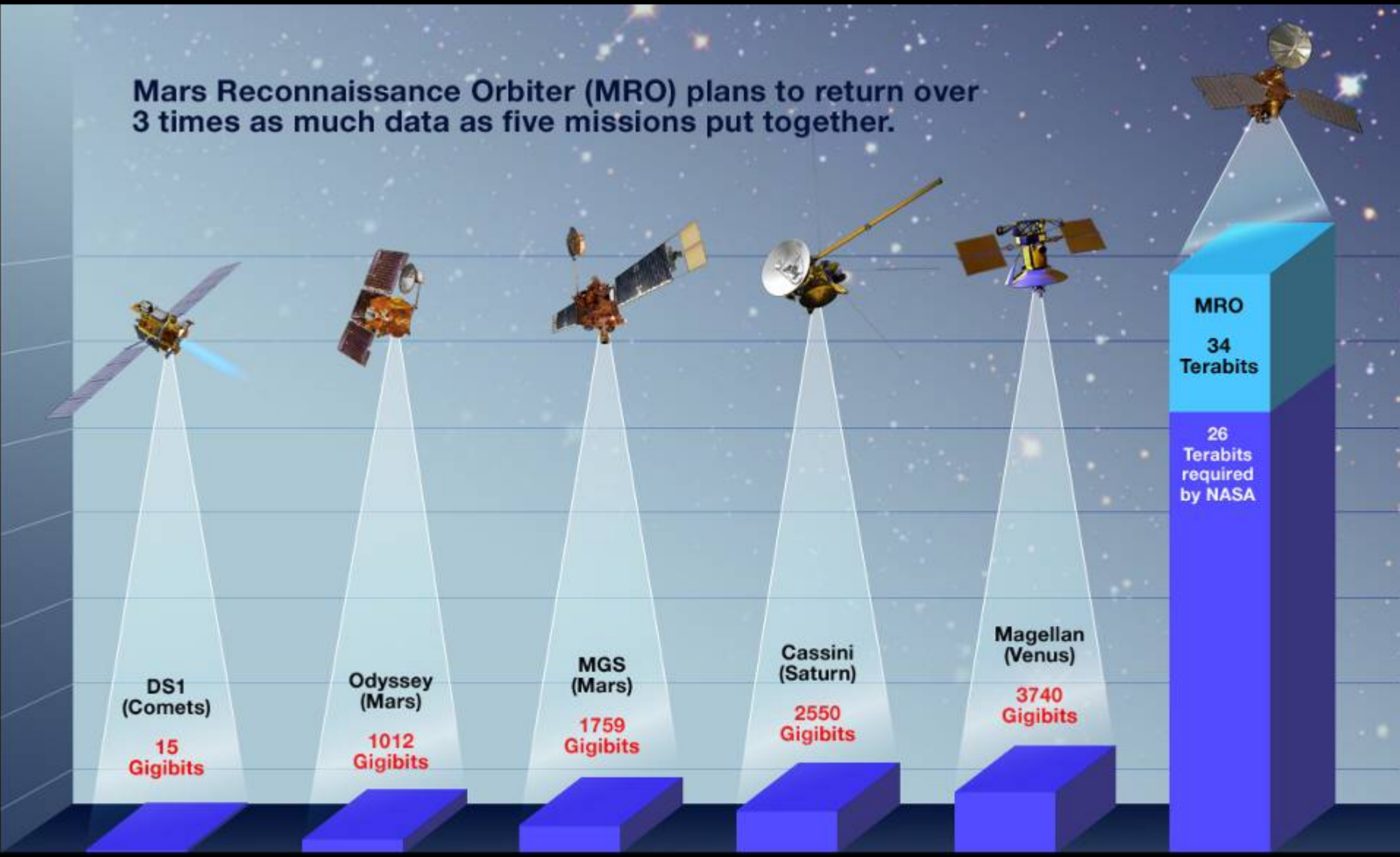
Science and Engineering Payloads



Cumulative Data Volumes during the PSP

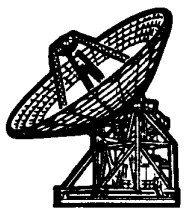


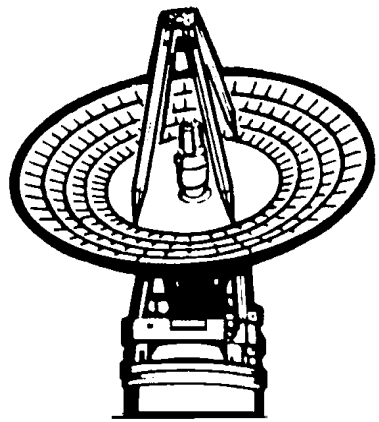
Science Data Collection/Return - Comparisons



DSS-63 Downtime Extension Recommendations Weeks 36 – 39, 2006

Presented by:
Art Andujo
Ernestine Hampton

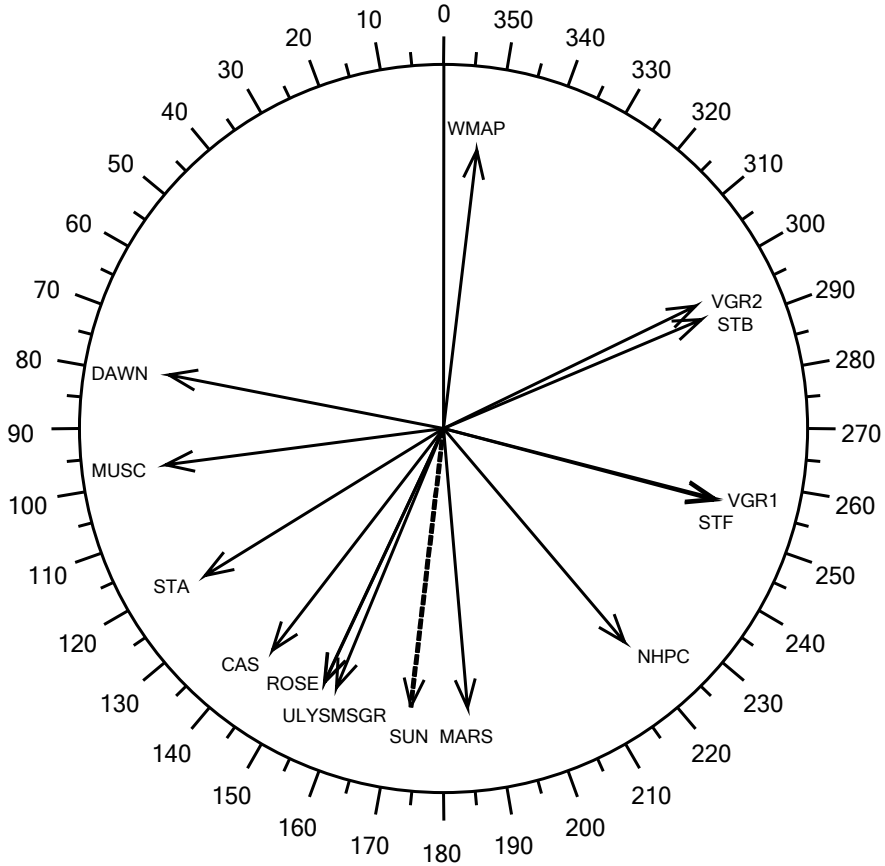




Joint Users Resource Allocation and Planning Meeting

Spacecraft Right Ascension

September 15, 2006



THE SPACECRAFT RIGHT ASCENSION FIGURES SHOW THE POSITIONS OF THE SPACECRAFT IN THE SKY RELATIVE TO EACH OTEHR ON THE 15TH OF EACH MONTH FOR THE YEAR INDICATED. RIGHT ASCENSION IS COMMONLY MEASURED IN HOURS, WITH 1 HOUR = 15 DEGREES.

THE ARROW INDICATES THE CENTER OF A SPACECRAFT VIEW FROM EARTH. EXTEND 60 DEGREES ON BOTH SIDES OF THE ARROW TO CALCULATE AN EIGHT (8) HOUR VIEW PERIOD.

DSN Major Downtimes by Date

– 2006 –

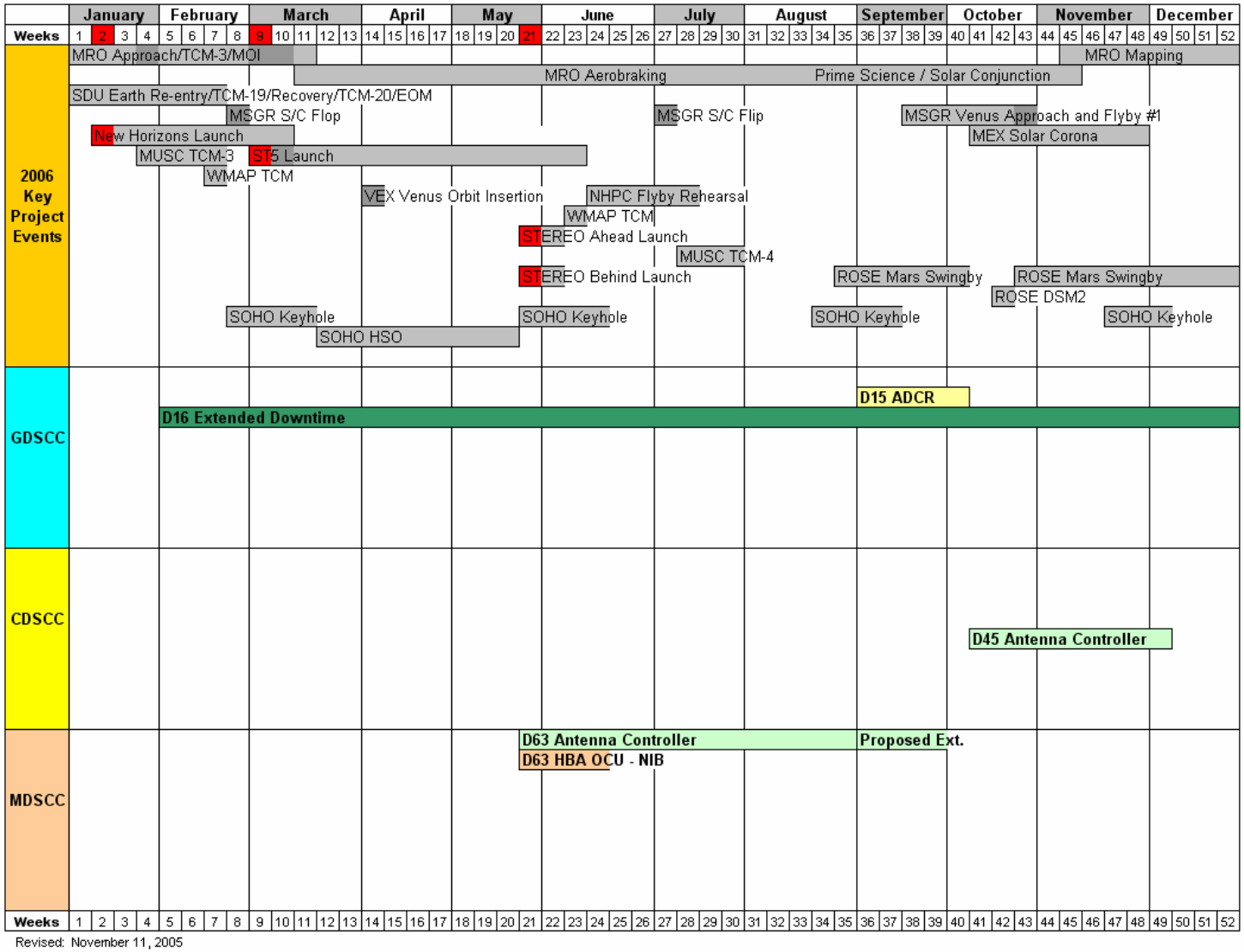
Site	Description	Start	End	Duration (days)	Week(s)	Start DOY	End DOY
DSS 16	Extended Downtime	01/30/2006	12/31/2009	1432	05 – 53	030	365
DSS 63	Antenna Controller Replacement	5/22/2006	09/03/2006	105	21 – 35	142	246
DSS 63	Antenna Controller Replacement - Extension	09/04/2006	10/01/2006	28	36 – 39	247	274
DSS 15	Antenna Drive Cabinet Refurbishment	09/04/2006	10/08/2006	35	36 – 40	247	281
DSS 45	Antenna Controller Replacement	10/08/2006	12/10/2006	64	40 – 49	281	344

Note:
DSS-63 downtime changes above are to reflect an extension to the existing Antenna Controller Replacement downtime of 4 weeks for Antenna Controller Replacement in weeks 36 – 40 of 2006.

Joint Users Resource Allocation and Planning Meeting

DSN Major Downtimes by Date

– 2006 –



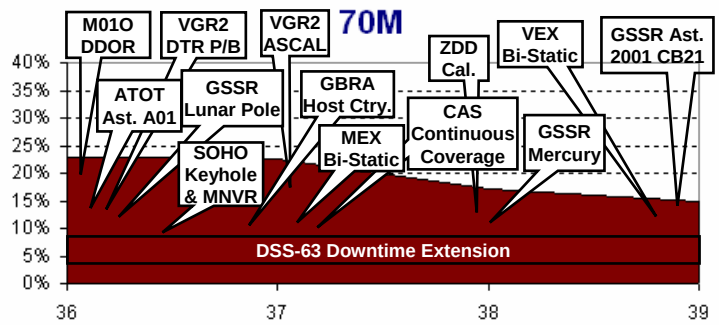
Revised: November 11, 2005

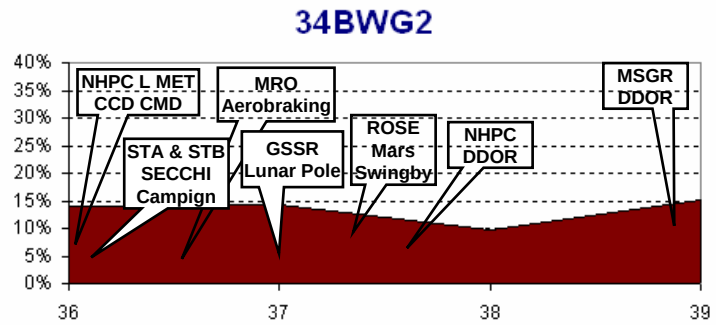
Joint Users Resource Allocation and Planning Meeting

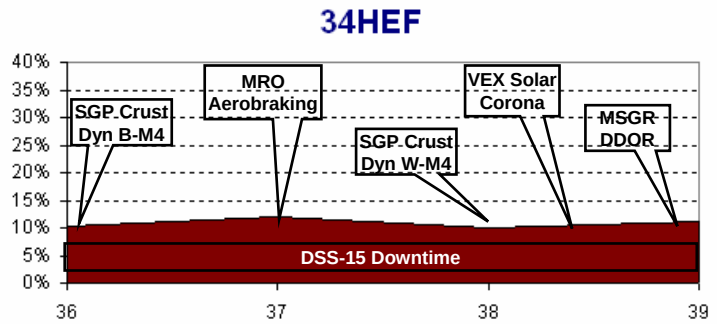
Major Events in weeks 36 – 39, 2006

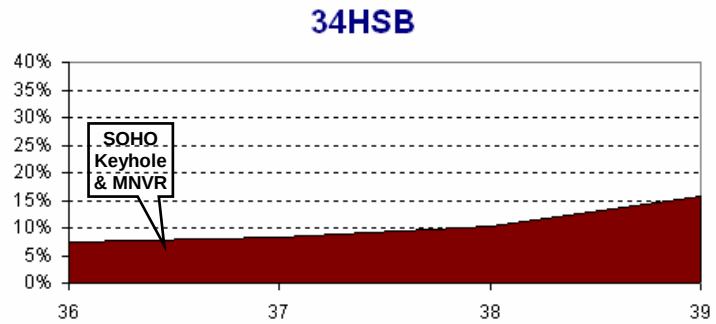
2006

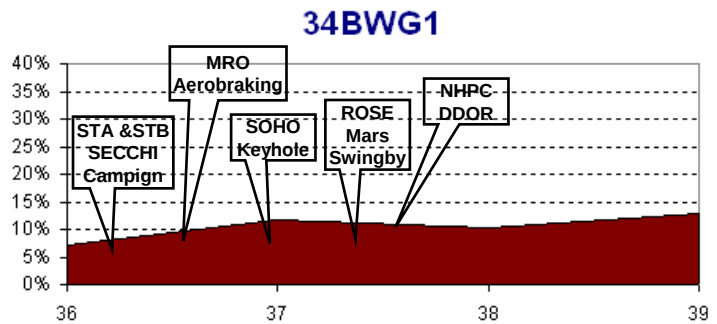
Percent of Unsupportable Time by Subnet

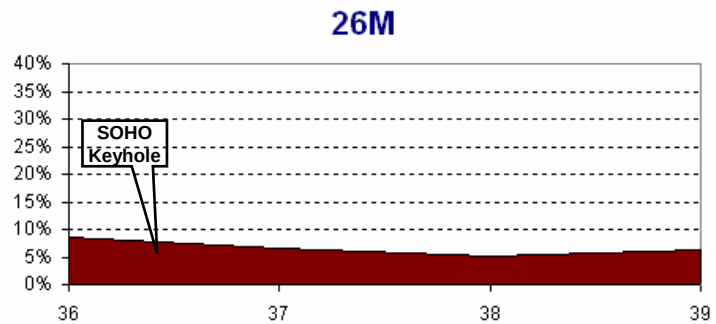












RECOMMENDATIONS

ATOT delete support in week 36

CAS delete all passes in weeks 37 and 38 at DSS-63 and add 2 DSS-65 R/S passes in week 37 and 1 pass in both weeks 37 and 38 at DSS-54,55,65. Additionally Cassini has negotiated the possible support of Cassini by DSS-63 as a DEMO track during the Test and Validation phase of the DSS-63 downtime in week 37, DOY 259.

DSN ANTCAL S/X delete supports at DSS-43 and DSS-63 in weeks 37 and 38.

DSN ANTCAL X/Ka (Wk 36) delete support at DSS-25 and DSS-55.

DSN ZDD CAL (Wk 38) reduce support duration from 10 hours to 8 hours at DSS-14.

DSS Maintenance (Wk 37) reduce DSS-14 routine maintenance from 2 supports to 1 support and delete all DSS-63 maintenance in wks 36 – 39.

GBRA Guest OBSER (Wk 38) delete 70M support, (Wk 37) delete Host Country at DSS-63, delete PRA-GAVRT support at DSS-14 and (Wk 38) reduce PRA-GAVRT support duration from 10 hours to 5 hours.

GSSR Mercury (Wk 38) delete support at DSS-14.

RECOMMENDATIONS (Continued)

NHPC reduce pass duration from 8 hours to 6 hours for 2 of 3 passes in week 38 and 3 passes in week 39.

RFC reduce Cat S/X and X/Ka from 24 hours to 12 hours in week 36 and 39.

SGP delete support in weeks 36 and 38

SOHO reduce all 70M Keyhole support duration to 2 - 4 hours in weeks 36 and 37. Move Keyhole Maneuver from DSS-14/27 to DSS-24 in week 36.

RECOMMENDATIONS

- This reflects the available hours and passes based upon recommendations to support M010, MEX and MGS within the Mars view period. It is assumed that these supports will MSPA.

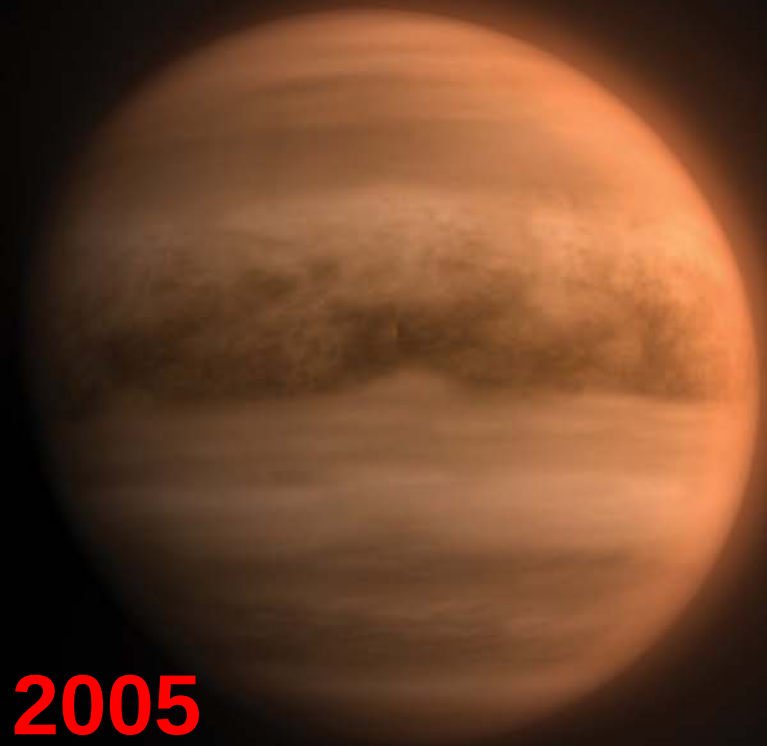
Base Requirements:
M01O = 7 x10hr x 70M
MGS = 9-10 x10hr x 34M
MEX = 7 x 8hr x 34M (Solar Corona &, Bi-Static R/S)

Subnet summary without Setup and Teardown

Subnet	September 36	37	38	39
70M Hours	62	34.5	70	70
34B1 Hours	10	0	0	0
34B2 Hours	28	80.5	56	48
34H Hours	34	3	0	8
Weekly Total	134	118	126	126

User	Resource	Durations Ave	Min	Calibratio Pre	Post	September 36	37	38	39
M01O/MGS/MEX	DSS-14	10.0	4.0	2.00	0.25			1	1
M01O/MGS/MEX	DSS-43	9.5	4.0	1.00	0.25	1			
M01O/MGS/MEX	DSS-43	10.5	4.0	1.00	0.25	5			
M01O/MGS/MEX	DSS-43	3.0	3.0	1.00	0.25		1		
M01O/MGS/MEX	DSS-43	10.5	4.0	2.00	0.25		3		
M01O/MGS/MEX	DSS-43	10.0	4.0	2.00	0.25			6	6
M01O/MGS/MEX	DSS-34	10.0	4.0	1.00	0.25	1			
M01O/MGS/MEX	DSS-25	8.0	4.0	1.00	0.25			6	6
M01O/MGS/MEX	DSS-26	10.0	4.0	1.00	0.25	1			
M01O/MGS/MEX	DSS-26	9.0	4.0	2.00	0.25	2			
M01O/MGS/MEX	DSS-26	10.5	4.0	2.00	0.25		1		
M01O/MGS/MEX	DSS-26	7.0	4.0	1.00	0.25		1		
M01O/MGS/MEX	DSS-26	8.0	4.0	1.00	0.25		4	1	
M01O/MGS/MEX	DSS-55	8.5	4.0	2.00	0.25		1		
M01O/MGS/MEX	DSS-55	8.0	4.0	1.00	0.25		1		
M01O/MGS/MEX	DSS-55	4.0	4.0	1.00	0.25		1		
M01O/MGS/MEX	DSS-55	3.5	3.5	1.00	0.25		3		
M01O/MGS/MEX	DSS-45	9.0	4.0	2.00	0.25	3			
M01O/MGS/MEX	DSS-45	3.0	3.0	1.00	0.25		1		
M01O/MGS/MEX	DSS-65	7.0	4.0	2.00	0.25	1			
M01O/MGS/MEX	DSS-65	8.0	4.0	1.00	0.25				1

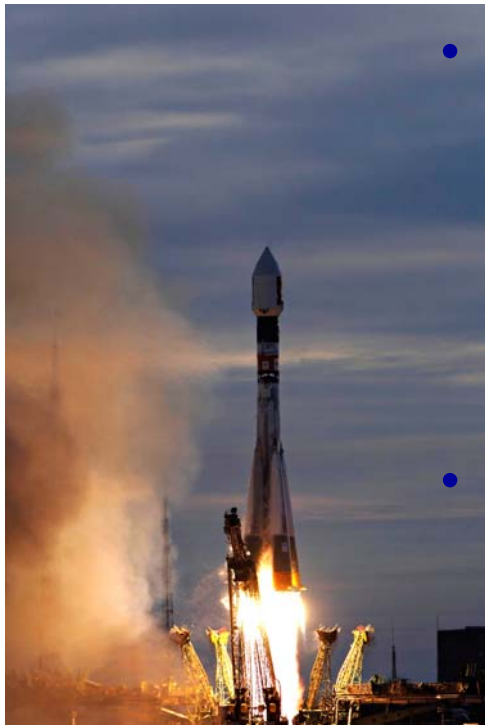
Venus Express Status Report



Report to JURAP 17 Nov 2005

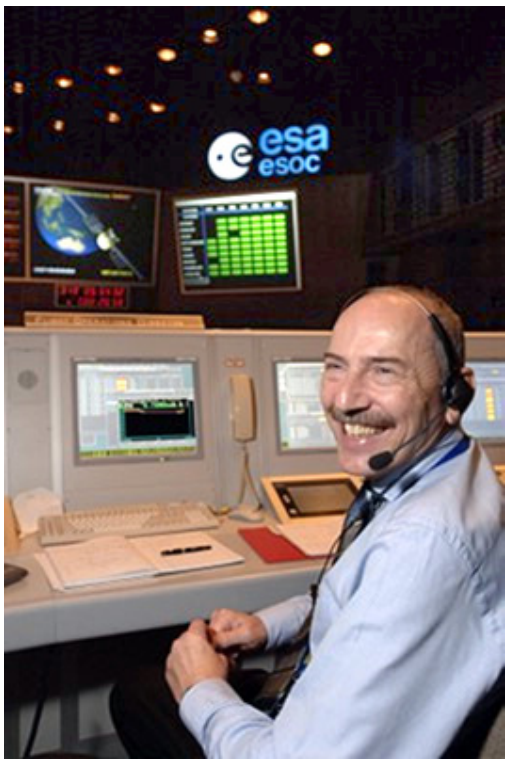
D. Holmes

VEX Launch and Early Orbit



- **Launched from Baikonur, Kazakhstan Russia**
  - **Soyuz/Fregat lifted off from STARSEM launch facilities at 03:33:34.454 UTC on November 9th**
  - **STARSEM announced VEX separation occurred nominally at L+ 1:36:30 hours**
  - **Five month journey to Venus**
- **Spacecraft downlink first acquired by ESA stations at Perth and New Norcia at 05:30:40 and 05:30:42 UTC respectively.**
  - **DSN stations DSS-46 and DSS-34 acquired nominally at 05:34 and 05:41 UTC respectively.**
  - **All acquisitions were nominal and right at predicted locations.**
  - **Spacecraft launch injection errors of were within 3 sigma of trajectory design**

VEX Launch and Early Orbit



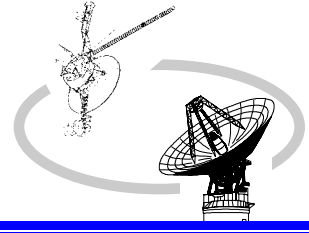
- **Second day LEOP activities continued with extremely smooth operations**
  - **Goldstone provided support while spacecraft remained in S-band mode**
  - **ESA station at Kourou on DOY 314, pass #2, supported switch from low gain to high gain antennas with switch form S band to X band**
  - **The ESA 35m station at Cebreros supported its first pass at X-band and successfully commanded the spacecraft**
  - **First TCM accomplished on DOY 314 at 06:14 with an accuracy error within .034%.**
  - **LEOP completed on 11 November (DOY 315) at L+53:15**
  - **Goldstone support released for next passes on DOY 315 and 321**

JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

Resource Analysis Team

November 17, 2005

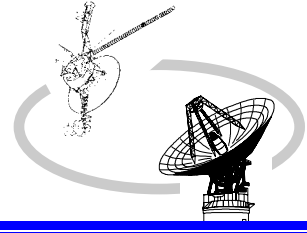
Joaquin Retana



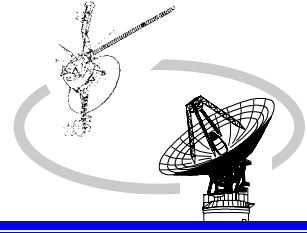
Mid-Range Scheduling Status

- **RESOURCE NEGOTIATION STATUS**
  - 2006 WEEKS 01 - 04 (THRU 01/29/2009) WERE RELEASED TO DSN SCHEDULING ON 11/15/2005.
  - 2006 WEEKS 05 - 08 (THRU 02/26/2006) ARE DUE TO BE RELEASED TO DSN SCHEDULING ON 12/05/2005.
  - 2006 WEEKS 09 - 18 (THRU 05/07/2006) ARE AWAITING CONFLICT RESOLUTION OF REMAINING CONFLICTS
- The Mid-range Scheduling process has negotiated schedules 24 weeks ahead of real-time. Currently, there are 13 weeks of conflict-free schedules. Conflict Resolution is required for the following eleven (11) weeks: 05/2006 through 12/2006, 14/2006, 16/2006 and 18/2006.

Resource Allocation Planning Service (RAPS)



- **SIGNIFICANT EVENTS**
  - The RAP Team has been able to catch up with negotiations. No additional recovery meetings will be required for the rest of the year. **A special thanks to all the project representatives.**
- **ON-GOING SPECIAL STUDIES/ACTIVITIES**
  - Downtime Planning
  - MADB/TIGRAS Testing, Training and Database update
  - New STEREO A & B May 26, 2006 Launch Study
  - RARB Prep for February



◆ SPECIAL STUDY SUMMARY

Preliminary Assessment of SOHO HSO Schedule (March – May 2006) **Completed: Sept 19, 2005**

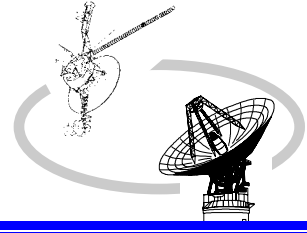
Purpose

The SOHO project tasked RAPS to evaluate the impact to SOHO Helioseismology Observations (HSO) period March – May 2006 with the DSS-16 closure.

Conclusion

SOHO can expect to receive acceptable coverage at Goldstone in these weeks, any contention will be handled during the Mid-Range negotiation process.

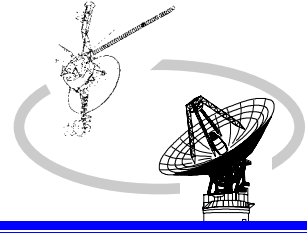
Resource Allocation Planning Service (RAPS)



– Ongoing / Approved Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
DSN Antenna Calibration	DSN	--	--	--
DSS Maintenance	DSS	--	--	--
DSN ZDD Calibration	DSN	11/01/04	--	--
European and Global VLBI Systems	EGS	--	--	--
Ground Based Radio Astronomy	GBRA	--	--	--
Reference Frame Calibration (Cat M&E and Clock Sync)	DSN	--	--	--
Space Geodesy	SGP	--	--	--
Voyager 2	VGR2	08/20/77	10/15/89	09/30/06
Voyager 1	VGR1	09/05/77	12/31/80	09/30/06
Goldstone Solar System Radar	GSSR	04/01/85	--	--
Ulysses	ULYS	10/06/90	09/11/95	03/30/08
Geotail	GTL	07/24/92	07/24/95	10/01/08
Wind	WIND	11/01/94	11/01/97	10/01/11
SOHO	SOHO	12/02/95	05/02/98	10/01/11
Polar	POLR	02/22/96	08/23/97	12/31/06
Mars Global Surveyor	MGS	11/07/96	02/01/01	11/03/09
Advance Composition Explorer	ACE	08/25/97	02/01/01	10/01/13

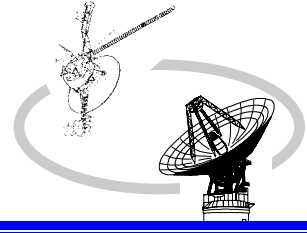
Resource Allocation Planning Service (RAPS)



– Ongoing / Approved Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
Cassini	CAS	10/15/97	06/30/08	06/30/10
Stardust	SDU	02/07/99	02/15/06	- - -
Chandra X-Ray Observatory	CHDR	07/23/99	07/24/09	07/24/14
Imager for Magnetopause-to-Aurora Global Exploration	IMAG	03/25/00	05/30/02	10/01/11
Cluster 2 - S/C #2 (Samba)	CLU2	07/16/00	02/15/03	12/31/09
Cluster 2 - S/C #3 (Rumba)	CLU3	07/16/00	02/15/03	12/31/09
Cluster 2 - S/C #1 (Salsa)	CLU1	08/09/00	02/15/03	12/31/09
Cluster 2 - S/C #4 (Tango)	CLU4	08/09/00	02/15/03	12/31/09
Mars Odyssey 2001	M01O	04/07/01	08/24/04	12/31/10
Wilkinson Microwave Anisotropy Probe	WMAP	06/30/01	10/01/03	09/30/09
Advanced Tracking and Observational Techniques (ATOT)	ATOT	02/01/02	12/31/08	- - -
International Gamma Ray Astrophysics Lab	INTG	10/17/02	12/18/04	12/31/08
Hayabusa (MUSES - C)	MUSC	05/09/03	06/10/07	- - -
Mars Express Orbiter	MEX	06/02/03	02/11/06	12/31/08
Spirit (Mars Exploration Rover - A)	MER2	06/10/03	04/06/04	09/30/08
Opportunity (Mars Exploration Rover - B)	MER1	07/07/03	04/27/04	09/30/08
Spitzer Space Telescope (SIRTF)	STF	08/25/03	02/25/06	10/19/08

Resource Allocation Planning Service (RAPS)



– Ongoing / Approved Projects –

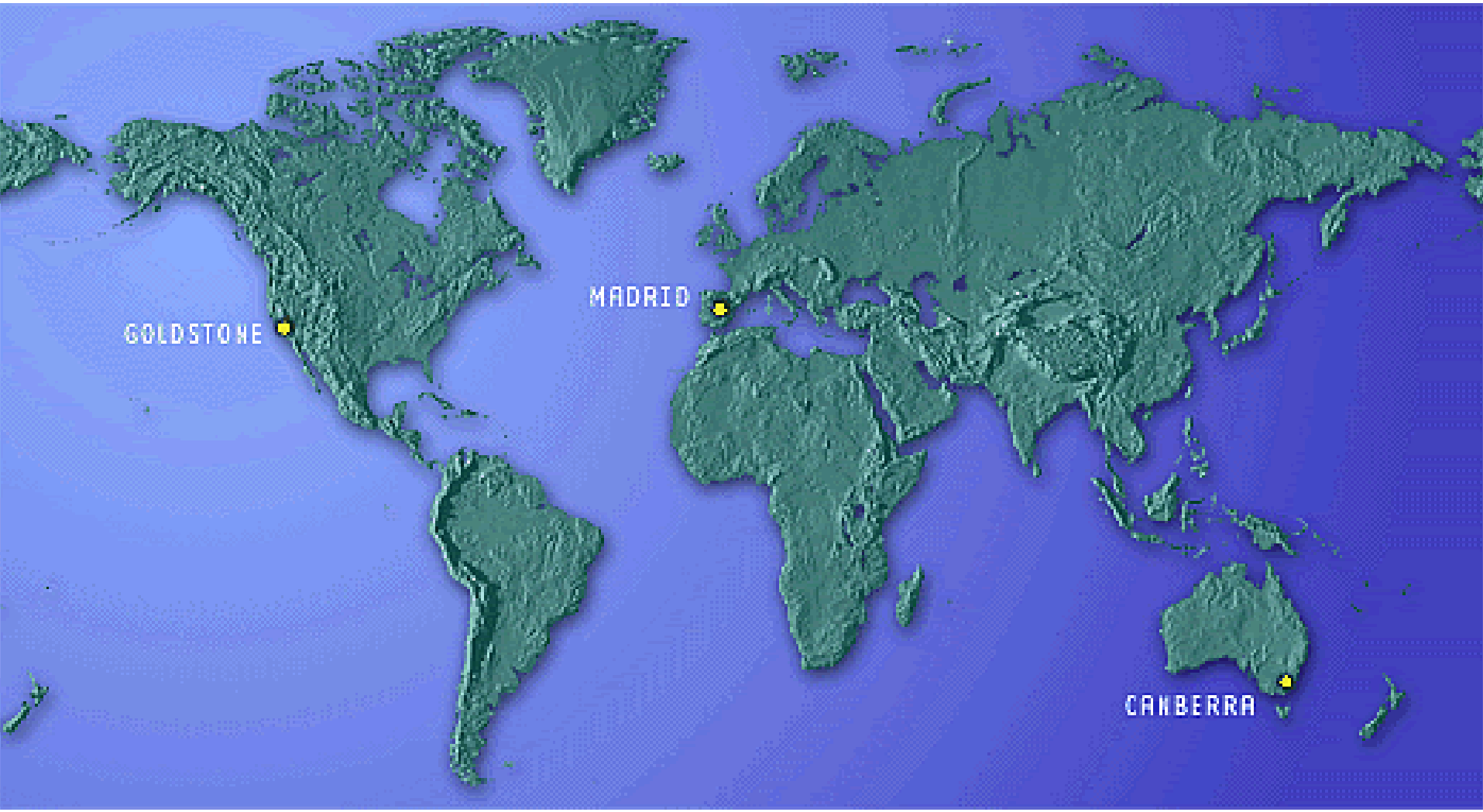
Project	Acronym	Launch or Start	EOPM	EOEM
Rosetta	ROSE	02/26/04	12/31/15	- - -
Messenger	MSGR	08/03/04	03/19/12	- - -
Mars Reconnaissance Orbiter	MRO	08/12/05	12/31/10	12/31/15
Venus Express	VEX	11/09/05	04/09/06	TBD
New Horizons	NHPC	01/11/06	04/17/16	TBD
Space Technology 5 - S/C #1	ST51	02/28/06	06/11/06	TBD
Space Technology 5 - S/C #2	ST52	02/28/06	06/11/06	TBD
Space Technology 5 - S/C #3	ST53	02/28/06	06/11/06	TBD
Stereo Ahead	STA	TBS	07/13/08	07/13/11
Stereo Behind	STB	TBS	07/13/08	07/13/11
Dawn	DAWN	TBS	01/12/16	TBD
Phoenix	PHX	08/03/07	10/26/08	TBD
Kepler Mission	KLM	06/01/08	06/30/12	- - -
Lunar - A	LUNA	08/01/09	03/10/10	- - -
Rosetta	ROSE	02/26/04	12/31/15	- - -

Resource Allocation Planning Service (RAPS)

– Advanced / Planning Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
SELENE	SELE	02/01/07	02/21/07	TBD
Juno	JUNO	06/06/09	08/09/15	TBD
Mars Science Laboratory 2009	MSL	10/25/09	03/04/12	TBD
Space Interferometry Mission	SIM	03/11/11	08/30/20	TBD
James Webb Space Telescope	JWST	08/01/11	07/31/16	TBD
Mars Placeholder 2011	M11L	10/30/11	09/10/14	TBD
Mars Placeholder 2013	M13O	11/28/13	08/21/16	TBD

DSN Antenna Downtime Status and Forecast



http://rapweb.jpl.nasa.gov/planning

Proposed Downtimes Recommendations

2006

- DSS-63 to add 4 additional weeks to the back end of the DSS-63 Antenna Controller downtime in 2006. Change the DSS-63 Downtime from weeks 21 to 35 to weeks 21 to 39.

2008

- DSS-54 X/X-Ka Band Installation proposed move from weeks 14 – 21 in 2007 to weeks 08 – 15 in 2008

Antenna Downtime Status And Forecast Schedule

Major DSN Downtimes by Date

11/16/2005 12:54 UTC Time
Wednesday, November 16, 2005 9:53:57 AM Your Local Time

2005

Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 43	Antenna Controller Replacement	07/18/2005 04:00	01/01/2006 23:59	168	29 - 52	199	001
DSS 43	Hydrostatic Bearing	07/18/2005 04:00	01/01/2006 23:59	168	29 - 52	199	001
DSS 15	Antenna Controller Replacement	09/12/2005 00:00	12/04/2005 23:59	84	37 - 48	255	338

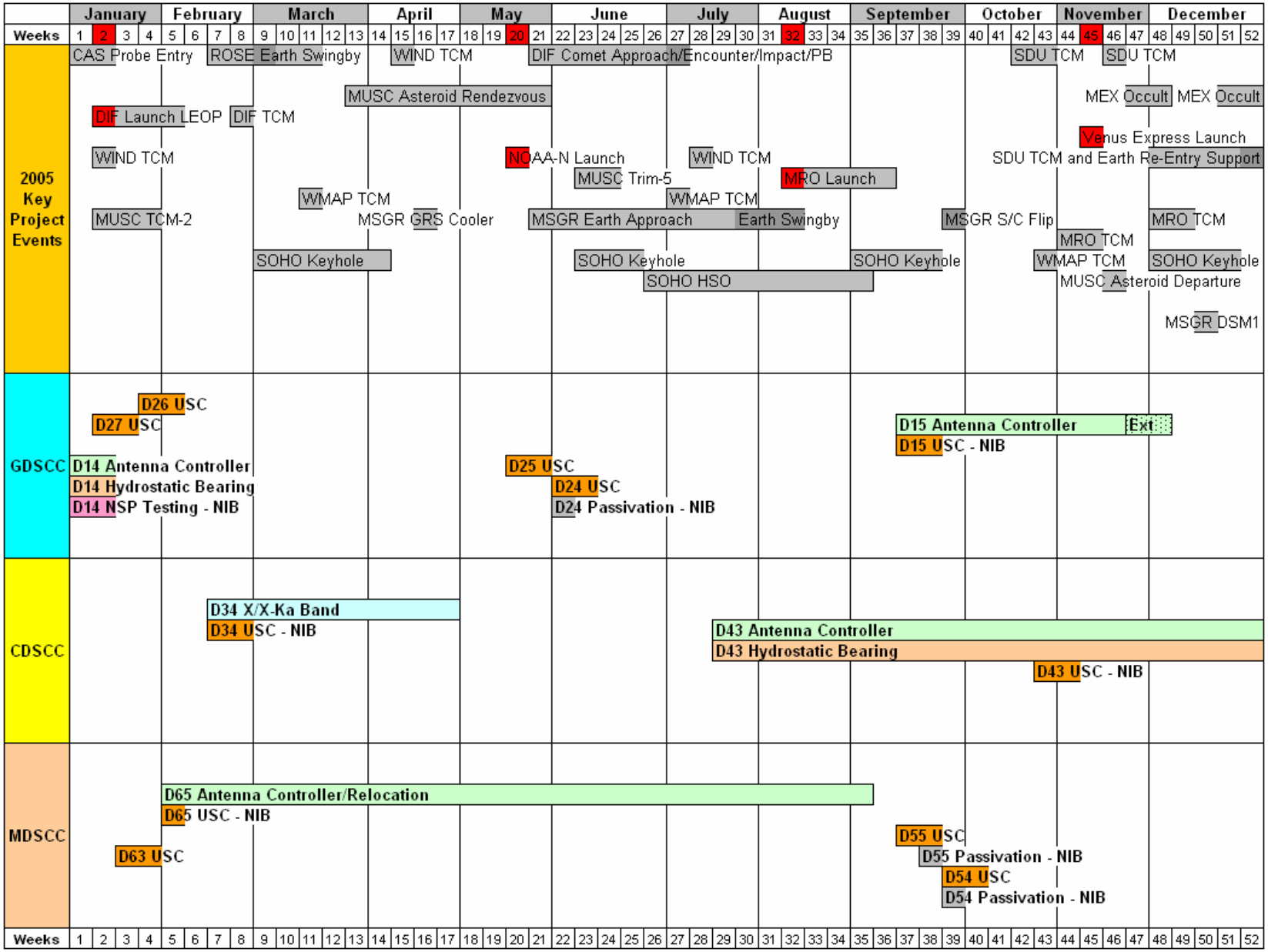
2006

Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 16	Extended Downtime	01/30/2006 16:00	12/31/2009 23:59	1432	05 - 53	030	365
DSS 63	Antenna Controller Replacement	05/22/2006 00:00	09/03/2006 23:59	105	21 - 35	142	246
DSS 15	Antenna Drive Cabinet Refurbishment	09/04/2006 00:00	10/08/2006 23:59	35	36 - 40	247	281
DSS 45	Antenna Controller Replacement	10/08/2006 22:00	12/10/2006 23:59	64	40 - 49	281	344

2007

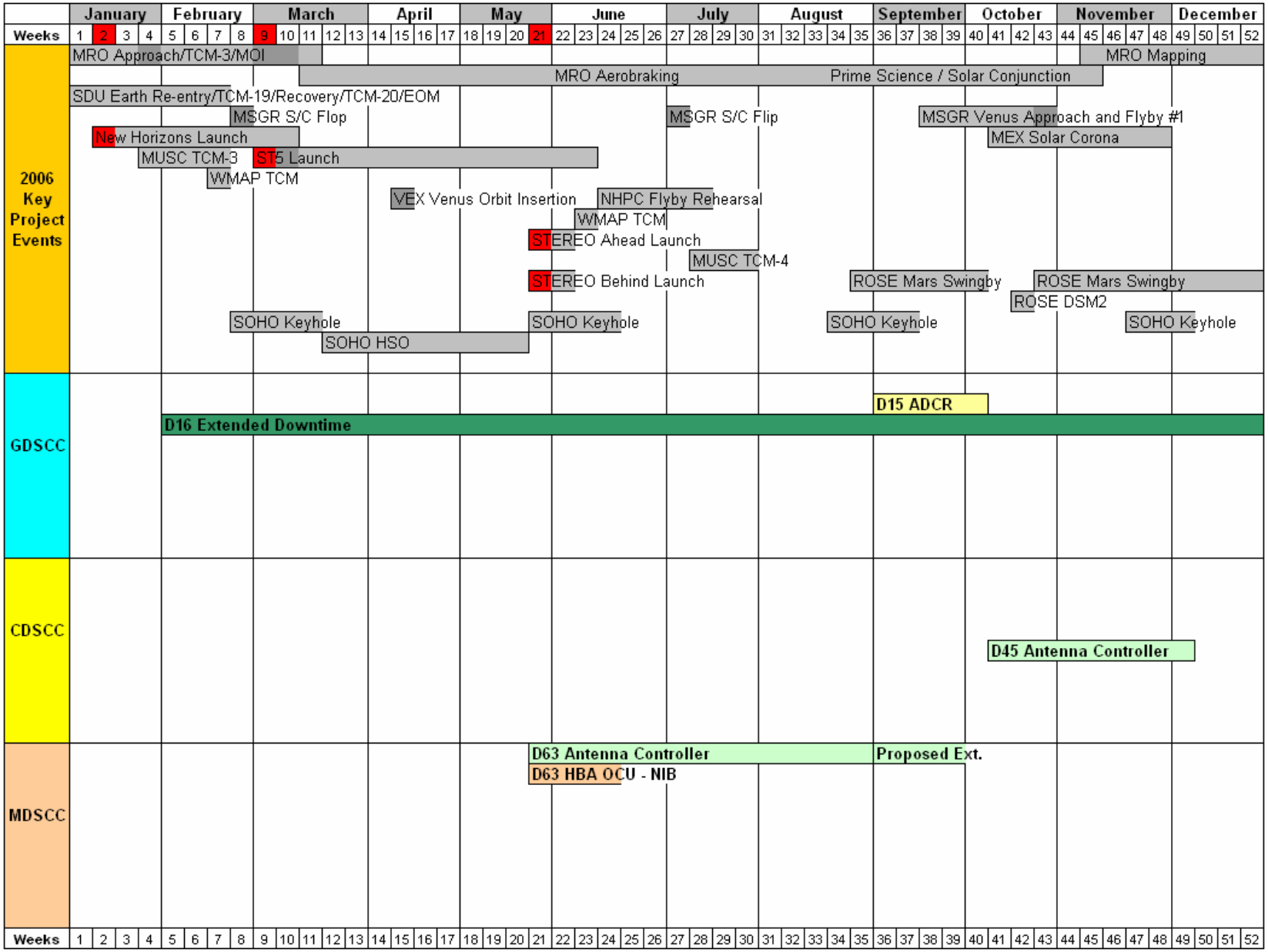
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 65	Antenna Drive Cabinet Refurbishment	02/26/2007 00:00	04/01/2007 23:59	35	09 - 13	057	091
DSS 54	X/X-Ka Band	04/02/2007 00:00	05/27/2007 23:59	56	14 - 21	092	147
DSS 63	Hydrostatic Bearing Replacement	06/12/2007 00:00	09/16/2007 23:59	97	24 - 37	163	259
DSS 45	Antenna Drive Cabinet Refurbishment	08/27/2007 00:00	09/30/2007 23:59	35	35 - 39	239	273

Antenna Downtime Status And Forecast 2005



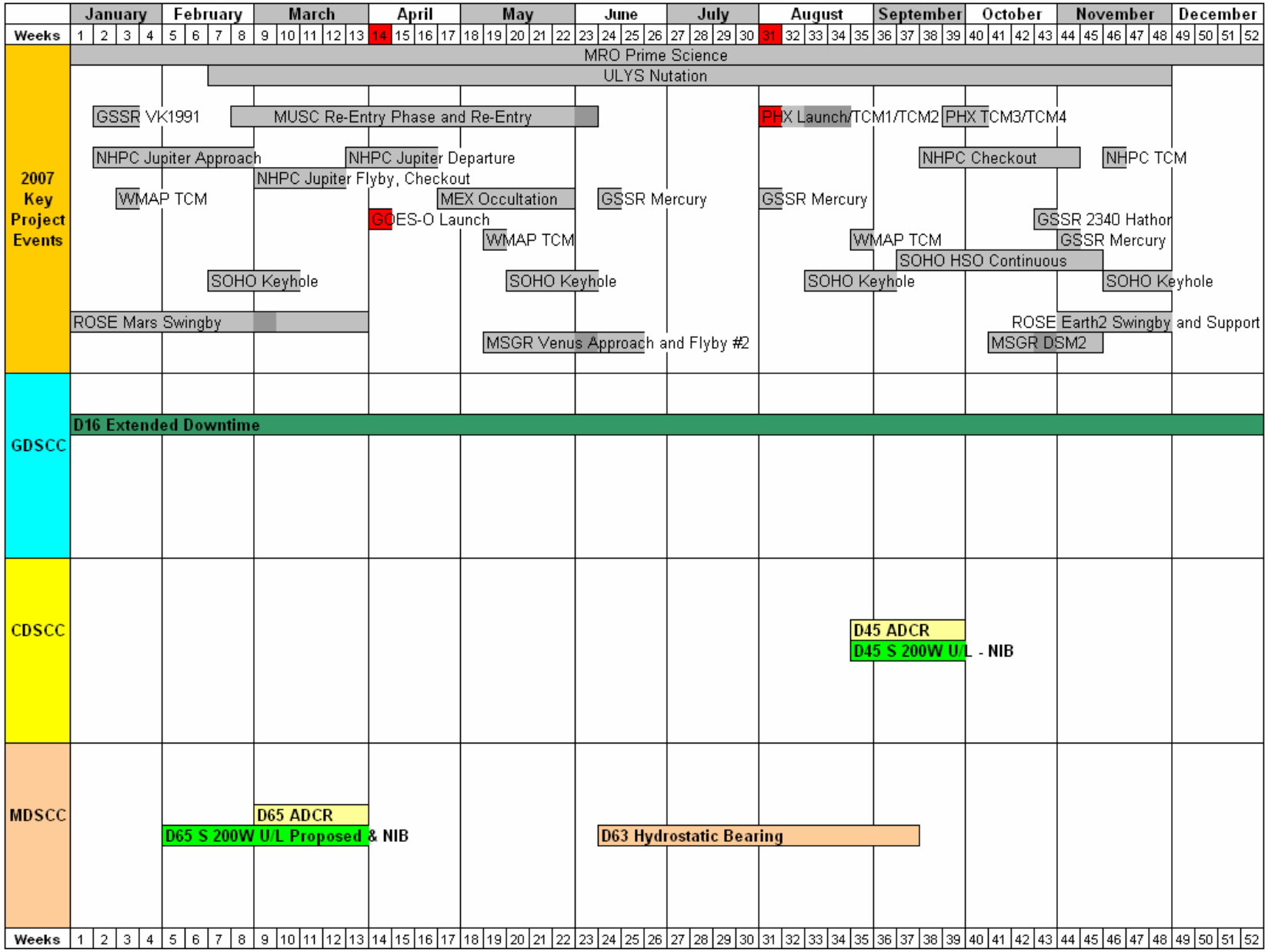
Revised: November 16, 2005

Antenna Downtime Status And Forecast 2006



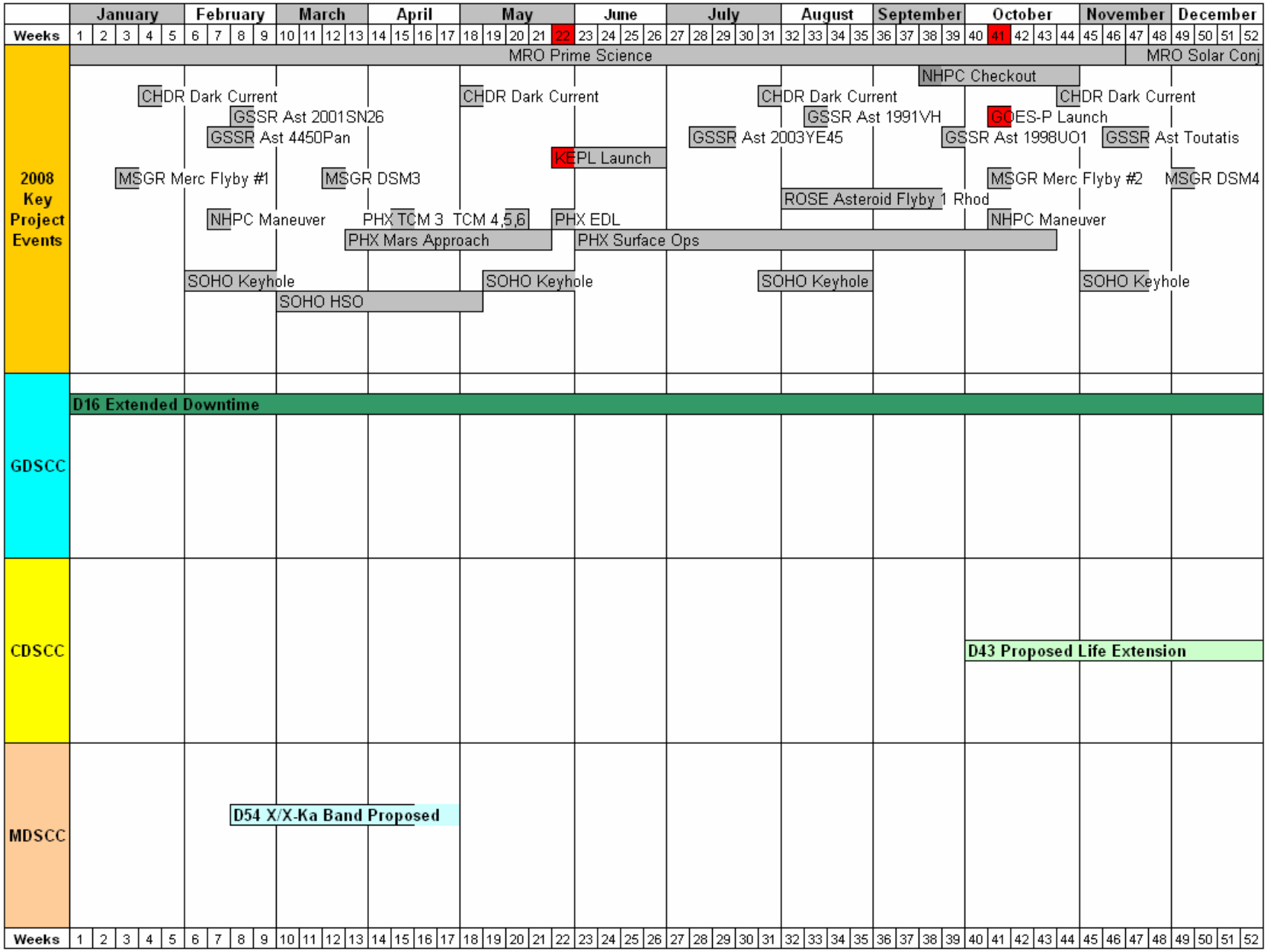
Revised: November 16, 2005

Antenna Downtime Status And Forecast 2007



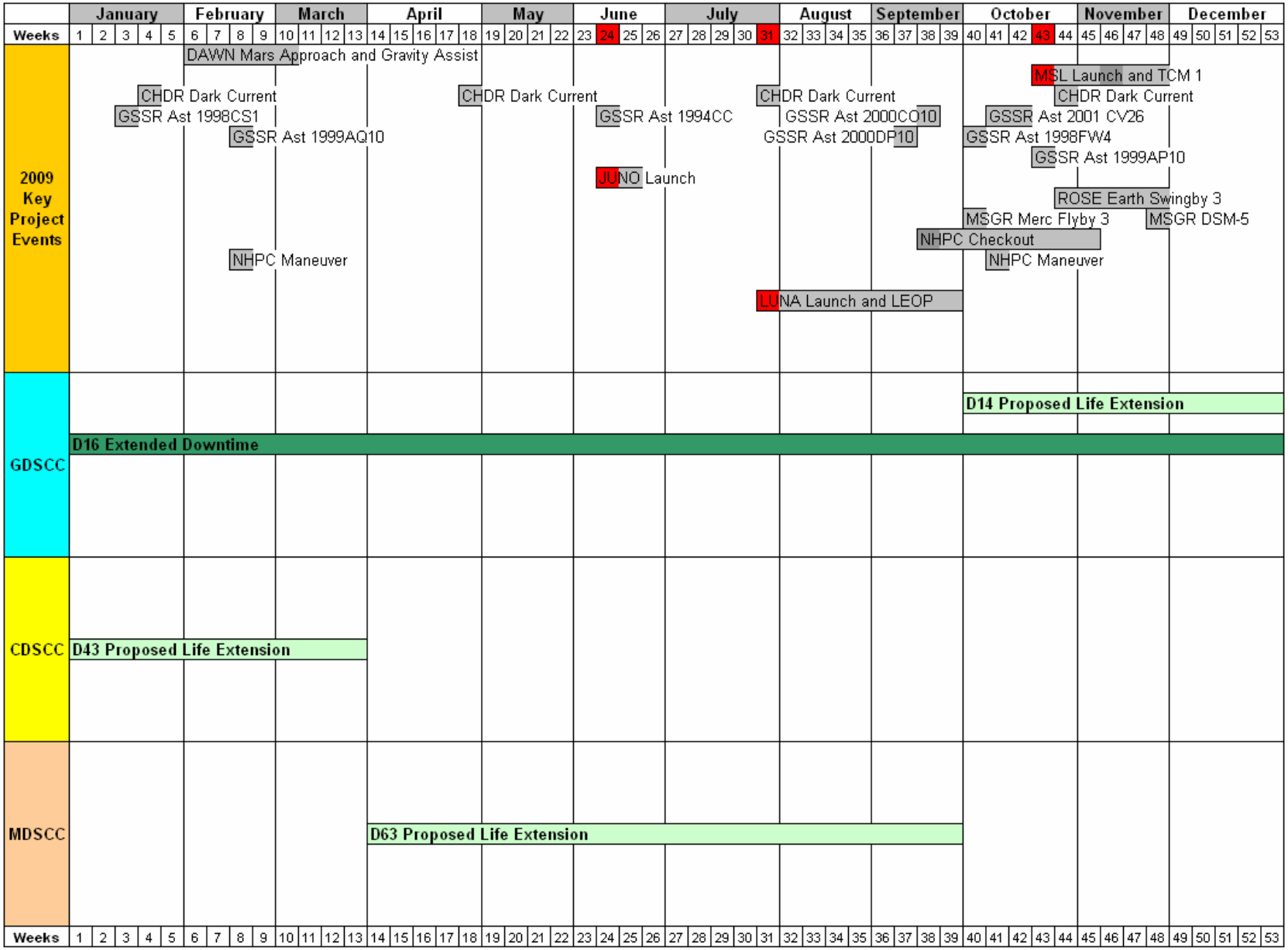
Revised: November 16, 2005

Antenna Downtime Status And Forecast 2008



Revised: November 16, 2005

Antenna Downtime Status And Forecast 2009



Revised: September 1, 2005

DSN Resource Implementation Planning Matrix by Complex

Complex	Station	Subnet	S-Band		X-Band		Ka-Band		NSP/
			Down	Up	Down	Up	Down	Up	TT&C
10	DSS-14	70M	✔	✔	✔	✔	N/A	N/A	✔
10	DSS-15	34HEF	✔	N/A	✔	✔	N/A	N/A	✔
10	DSS-16	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
10	DSS-24	34B1	✔	✔	✔	✔	N/A	N/A	✔
10	DSS-25	34B2	N/A	N/A	✔	✔	✔	✔	✔
10	DSS-26	34B2	N/A	N/A	✔	✔	03/01/06	N/A	✔
10	DSS-27	34HSB	✔	✔	N/A	N/A	N/A	N/A	12/01/05
40	DSS-34	34B1	✔	✔	✔	✔	✔ ✔ ✔	N/A	✔
40	DSS-43	70M	✔	✔	✔	✔	N/A	N/A	✔
40	DSS-45	34HEF	✔	N/A	✔	✔	N/A	N/A	✔
40	DSS-46	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
60	DSS-54	34B1	✔	✔	✔	✔	TBD	N/A	✔
60	DSS-55	34B2	N/A	N/A	✔	✔	02/01/06	N/A	✔
60	DSS-63	70M	✔	✔	✔	✔	N/A	N/A	✔
60	DSS-65	34HEF	✔	N/A	✔	✔	N/A	N/A	✔
60	DSS-66	26M	✔	✔	N/A	N/A	N/A	N/A	N/A

N/A = Capability Not Planned xx/xx/xx = Capability Date Recently Change As of: 11/03/05

✔ ✔ ✔ = Capability Recently Exists ✔ = Capability Exists

DSN Resource Implementation Planning Matrix by Subnet

Complex	Station	Subnet	S-Band		X-Band		Ka-Band		NSP/
			Down	Up	Down	Up	Down	Up	TT&C
10	DSS-16	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
40	DSS-46	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
60	DSS-66	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
10	DSS-27	34HSB	✔	✔	N/A	N/A	N/A	N/A	12/01/05
10	DSS-24	34B1	✔	✔	✔	✔	N/A	N/A	✔
40	DSS-34	34B1	✔	✔	✔	✔	✔ ✔ ✔	N/A	✔
60	DSS-54	34B1	✔	✔	✔	✔	TBD	N/A	✔
10	DSS-25	34B2	N/A	N/A	✔	✔	✔	✔	✔
10	DSS-26	34B2	N/A	N/A	✔	✔	03/01/06	N/A	✔
60	DSS-55	34B2	N/A	N/A	✔	✔	02/01/06	N/A	✔
10	DSS-15	34HEF	✔	N/A	✔	✔	N/A	N/A	✔
40	DSS-45	34HEF	✔	N/A	✔	✔	N/A	N/A	✔
60	DSS-65	34HEF	✔	N/A	✔	✔	N/A	N/A	✔
10	DSS-14	70M	✔	✔	✔	✔	N/A	N/A	✔
40	DSS-43	70M	✔	✔	✔	✔	N/A	N/A	✔
60	DSS-63	70M	✔	✔	✔	✔	N/A	N/A	✔

N/A = Capability Not Planned

xx/xx/xx = Capability Date Recently Change

As of: 11/03/05

✔ ✔ ✔ = Capability Recently Exists

✔ = Capability Exists